

## A SYNOPSIS OF THE ASIAN SPECIES OF DELPHINIUM, SENSU STRICTO

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AS IN THE PAPER on the Asian species of *Consolida* (Jour. Arnold Arb. 48: 159–202. 1967), the present article deals with plants from the Asian mainland and does not include the islands to the west in the Aegean and Mediterranean seas. The same herbaria, for the most part, have made loans and furnished material, as indicated in that paper (pp. 159, 160). I again acknowledge my indebtedness for and express my appreciation of the many courtesies and much help received. Additional aid is recorded from time to time in the body of this paper under individual species concerned.

It is a pleasure, too, to acknowledge obligations to National Science Foundation funds for Grant Number GB-2716, which very greatly helped, especially in work in European and British centers, and in partly meeting the cost of publication.

A discussion in the earlier paper presented the characters of the segregate genus *Consolida* (pp. 160, 161). There follow now a description of *Delphinium* in the more restricted sense and a synoptical treatment of the large number of Asian species. Unfortunately, herbarium material has not been available for all of those described, especially many first proposed by W. T. Wang (Acta Bot. Sinica 10: 59–89, 137–165, 264–284. 1962). Fortunately, the Royal Botanic Garden at Edinburgh received photographs of types of some of these species and I have found isotypes and other cited material in various American herbaria, especially in the large collection of unidentified Chinese specimens at the Arnold Arboretum. I am very much indebted to Dr. Shiu-Ying Hu of the Arboretum staff for translating critical passages and otherwise helping me with the Wang paper. In the same way, I gladly acknowledge the aid received from Mrs. Myra White, librarian of the Rancho Santa Ana Botanic Garden, whose ability to read Russian has helped with many passages in books dealing with the plants of the U. S. S. R. and with deciphering herbarium labels.

Since the publication of the monograph on *Delphinium*, sensu lato, by E. Huth (Bot. Jahrb. 20: 322–499. pls. 6–8. 1895), which has to be the basis for all subsequent study of the group, many students have expressed their dissatisfaction with two principal features.

(1) *The subdivisions of the genus as set up by Dr. Huth.* The genus *Delphinium* has some quite natural and well characterized subgroups or botanical sections. Others, both of Huth and Wang, seem meaningless to me and separate related species rather widely. For my purpose, therefore, I have keyed out the Asian species into ten Groups which I shall treat, in sequence, as Group I, Group II, etc. Where these seem to be of botanical



significance I shall so indicate. In most cases they may be quite artificial assemblages. For the most part, to facilitate finding the descriptions, the species under the larger groups are treated alphabetically. In some cases the same species is keyed out in more than one group.

(2) *Typification of some of Huth's varietal proposals.* Quite often no specimen is cited under a new variety and there is doubt as to what the taxon was meant to include and where it should come in the synonymy.

A paper, such as mine, is obviously a tentative treatment. Lack of more herbarium material, inability to do field work, recognition of the fact that the species of *Delphinium* hybridize freely, all such matters preclude the possibility of a truly monographic treatment. It is hoped, however, that the more than two years spent in this study and the examination of perhaps 6000 herbarium sheets make possible a more precise treatment for identification of Asian collections than we have yet had.

#### DELPHINIUM L.

*Delphinium*, as a genus, L. Sp. Pl. 1: 530. 1753; Gen. Pl. ed. 5. 236. 1754. E. Huth, Bot. Jahrb. 20: 322-499. pls. 6-8. 1895. As a subgenus, *Eudelphinium* (Huth) Dalla Torre & Harms, Genera Siphonogamarum 165. 1901.

Mostly perennial, more rarely biennial or annual, herbs; if perennial, with tuberiform compact roots or a woody deep-seated rootcrown or rhizome-like base with fibrous roots. Stems erect or ascending or much reduced. Leaves basal or cauline or both, persistent or withering early (especially the basal ones), palmatifid or lobed, often further divided or dissected. Flowers mostly in terminal racemes or panicles, sometimes only 1 or 2 on a stem. Pedicels subtended by more or less foliose bracts and bearing bractlets, the latter usually reduced and often two in number. Flowers zygomorphic. Calyx colored, of 5 sepals, the upper or posterior one spurred, the 2 lateral alike and the 2 lower alike. Petals 4, in 2 unlike pairs, the upper pair produced into nectariferous spurs that extend into the sepal spur and the upper part or lamina more or less cleaver-shaped; the lower pair with a slender claw and an expanded lamina which is often vertical to the claw. Stamens usually included, in 8 spiralled series, with filaments somewhat broadened and anthers short. Carpels 3-5, usually free, becoming follicles. Seeds mostly obpyramidal, winged or wingless at the angles, the surface variously beset with overlapping scales in transverse rows or ridged.

Type species, *Delphinium peregrinum* L.

#### KEY TO GROUPS OF ASIAN SPECIES OF DELPHINIUM

- A. Plants annual or biennial; petals glabrous and not ciliate.
  - B. Limb of upper petals with a lateral wing on one side and not clawed.
  - C. Leaf-blades palmately divided; lower petals not deeply divided. . . . .
- GROUP I.



- C. Leaf-blades pinnately divided; lower petals usually deeply divided. .... GROUP III.
- B. Limb of upper petals not winged on one side; upper petals with short claw. .... GROUP II.
- A. Plants perennial; lower petals bearded and/or ciliate.
  - D. Roots tuberous, clustered, short, vertical; flowers small (the sepals to ca. 1 cm. long), usually rather crowded in short-pedicelled (mostly to 1 cm.) often dense racemes; at least the upper leaves dissected into linear or oblong laciniae. Plants of rather arid regions, Mediterranean Region to Turkestan, Afghanistan, West Pakistan. .... GROUP IV.
  - D. Roots not tuberous, but mostly slender or cylindrical, rhizome-like; flowers mostly larger and often on longer pedicels.
    - E. Plants mostly very hairy; flowers mostly large, the sepals 2 cm. or more long, veiny, dry and papery in age, more or less persistent; plants low; spur thick, 4–10 mm. in diameter at its base, conical to decurved. Largely central Asia. .... GROUP V.
    - E. Plants usually less hairy; sepals not so veiny and papery, caducous; spur more slender.
      - F. Leaves dissected into linear, more or less oblong ultimate segments 1–3 mm. wide.
        - G. Stems with some well developed leaves. .... GROUP VI.
        - G. Stems without leaves or with 1 or 2 reduced ones. .... GROUP VII.
      - F. Leaves with broader, lanceolate to ovate ultimate divisions that are mostly over 5 mm. wide.
        - H. Spur not or scarcely uncinatate.
          - J. Petals not darker than the sepals. .... GROUP VIII.
          - J. Petals darker than sepals, almost black. .... GROUP IX.
        - H. Spur uncinatate, often forming a half circle. .... GROUP X.

It is my feeling that the present knowledge of the species of *Delphinium* growing in Asia is entirely inadequate in most cases to make any attempt whatsoever to recognize subspecies or varieties, at least by a person like myself whose work on the group has had to be entirely in the herbarium and not at all in the field. In the first place, I am confident that many of the taxa which I am recognizing as species will not retain that status. In the case of those, and of many others, no specimens were actually seen by me, although altogether I have probably had the opportunity of studying more than 6000 sheets. In some cases letters asking for loans or bits of material have not been answered up to now. In others, so few specimens were available that it was impossible to get the feel of the species, its variability or the geographical or zonal range for these variations. I am therefore, almost without exception, attempting only to differentiate what seem to me to be possible species, keying them and describing them as well as the scanty material allows, and not attempting to treat their subdivisions.

#### GROUP I

Mostly annual or biennial. Petals glabrous, the upper winged on one side, not clawed. Limb of lower petal not deflexed. Seeds numerous, rounded, with transverse rows of closely overlapping scales.



This group happens to coincide with the section *Delphinium*, as recognized by Pawlowski, *Fragm. Flor. et Geobot.* 9(4): 437. 1963, and with the section *Delphinellum* DC. *Syst.* 1: 346. 1817. The type species is *D. peregrinum* L., the type of the genus *Delphinium*.

#### KEY TO SPECIES

1. Limb of lower petals longer than wide, cuneate at base, gradually narrowed into a claw.
  2. The limb of the lower petals obovate, ca. as long as the claw; limb not or scarcely exerted. Eastern Mediterranean. . . . . 1. *D. peregrinum*.
  2. The limb of the lower petals elliptic-ovate, shorter than the claw and more or less exerted.
    3. Claw of lower petals ca. 6 mm. long; plant glabrous to strigulose. Turkey to Jordan and Palestine. . . . . 2. *D. virgatum*.
    3. Claw of lower petals ca. 4 mm. long; plant hirtellous or spreading-pubescent. Sinai Peninsula. . . . . 3. *D. nanum*.
1. Limb of the lower petals more or less rounded to quadrate, abruptly narrowed into a longer claw, the limb more or less exerted.
  4. Mature follicles sublinear, closely parallel, 10–12 mm. long; spur up to one and one-half times as long as the sepals. Turkey. . . 4. *D. cinereum*.
  4. Mature follicles broadly oblong, 5–8 mm. long; spur ca. twice as long as sepals.
    5. Racemes lax, linear, several-flowered; median cauline leaves thick in texture, with cuneate lobulate lobes. Turkey. . . . . 5. *D. venulosum*.
    5. Racemes dense, oblong, many-flowered; median cauline leaves thin, with lance-linear ultimate divisions. Turkey. . . . . 6. *D. davisii*.

#### 1. *Delphinium peregrinum* L. *Sp. Pl.* 1: 531. 1753. FIG. 1, A.

*Delphinium forskölii* Reichb. *Illustr. Sp. Acon.* 5: 68, *t.* 5. 1823–27. Type material seen (BM).

*Delphinium junceum* DC. *Fl. France* 5: 641. 1815.

*Delphinium peregrinum* subsp. *junceum* Batt. *Fl. Alg.* 16. 1888.

*Delphinium peregrinum* var. *junceum* Huth, *Bot. Jahrb.* 20: 475. 1895.

*Delphinium peregrinum* var. *subvelutinum* DC. *Syst.* 1: 348. 1817. Pubescent form based on Italian material.

*Delphinium bovei* Decaisne, *Ann. Sci. Nat.* II. 4: 356. 1835. Type *Bové 130* from between Suez and Gaza. This number seen (K).

*Delphinium peregrinum* var. *eriocarpum* Boiss. *Fl. Orient.* 1: 87. 1867. Based on plants from Caucasus with pubescent fruits.

*Delphinium eriocarpum* (Boiss.) Halacsy, *Consp. Fl. Graeca* 1: 32. 1901.

*Delphinium junceum* DC. var. *subvelutinum* Ledeb. *Fl. Ross.* 1: 59. 1841.

*Delphinium peregrinum* var. *ericalyx* Post, *Fl. Syria, Palestine Sinai*, 46. 1896.

*Delphinium subvelutinum* Heldr. ex Boiss. *Fl. Orient. Suppl.* 19. 1888.

Annual, more or less gray-pubescent on stems with short stiff, often retrorse hairs, plant 2–7 dm. tall, usually virgately branched from below, the branches stiff, straight, or sometimes spreading, ridged; lower leaves 3–5-parted, the parts cut into 3 or more lance-linear lobes; blades 1–3 cm.



long, often wider, longer than the petioles, glabrous, coriaceous; basal and middle leaves deciduous at anthesis; upper entire, linear, much reduced on upper stems, sessile; racemes terminal, many flowered; bracts subulate, 3–6 mm. long; pedicels stiff-pubescent, to almost 1 cm. long; bracteoles 2, to ca. 3 mm. long; flowers violet; upper sepal 7–8 mm. long, pubescent, the spur straight, pubescent, ascending, 15–20 mm. long and 3.5 mm. wide at its base; lateral sepals lance-oblong, pubescent, 5–7 mm. long; lower pair more pointed and with pubescence more median; upper petals appearing bilobed because of the broad ovate to elliptical lateral wing, the lamina ca. 7 mm. long, yellowish at base, violet toward apex; lower petals 8–10 mm. long, the blade longer than wide and gradually narrowed into the slender claw; stamens 5–8 mm. long, with somewhat lavender filaments; follicles 3, pubescent to glabrous, 7–8 mm. long (including the style); seeds rounded, ca. 1 mm. long, the scales united into transverse rows.

TYPE: Specimens in Clifford Herb. (BM), probably originally from Italy, Sicily or Malta.

DISTRIBUTION. Largely at elevations below 2000 m., fallow fields, calcareous places, etc., from type region to Egypt, Turkey, Jordan, and Iran.

ILLUSTRATIONS. SIBTHORP & SMITH, *Fl. Graeca* 6: *t.* 506. 1826; DAVIS, *Fl. Turkey* 1: 129. 1965.

REPRESENTATIVE SPECIMENS of the species complex are: Turkey: *Kotschy* 1; *Balansa* 728; *Sintenis* 1207; *Balls* 1207; *Davis* 13567. Lebanon: *Gaillardot* 52 and 367; *Davis* 9913. Israel: *F. S. Meyers* 99; *Davis* 4801; *Boissier*, April, 1846. Iraq: *Field & Lazar* 730 and 850. Iran: *Layard*, ex Herb. J. Ball. Egypt: *Bové* 130.

Plants from Asia tend to have pubescent follicles and constitute the var. *eriocarpum* Boiss., if this variety is tenable. Those with the inflorescence condensed have been called var. *densum* Post, *Fl. Syria, Palestine Sinai* 46. 1896.

## 2. *Delphinium virgatum* Poir. in *Lam. Encycl.* 10: 458. 1811.

FIG. 1, B.

*Delphinium peregrinum* var. *virgatum* (Poir.) Huth, *Bot. Jahrb.* 20: 475. 1895.

*Delphinium peregrinum* var. *laxum* Post, *Fl. Syria, Palestine Sinai* 46. 1896.

Much like *Delphinium peregrinum*, but glaucous, glabrous to strigulose; lower leaves cuneate-obovate, short-petioled, the blades with 3–5 coarse mucronate teeth at apex; midcauline leaves subentire, subsessile, sharply acute, passing upward into lanceolate bractlike leaves ca. 1 cm. long; flowers deep blue, strigulose, 20–22 mm. long; sepals lanceolate, 8–10 mm. long; spur 14–18 mm. long, spreading-curved; upper petal with glabrous winged blade ca. 10 mm. long, the spur 14 mm.; lower petals with ovate, slightly exserted limb ca. 3 mm. long, broadly cuneate at base, gradually contracted into a claw 6 mm. long; carpels glabrous.

TYPE: Syria, *Labillardière* (FI); not seen.

ILLUSTRATION. DELESSERT, *Icon. Pl.* 1: *t.* 55. 1820.



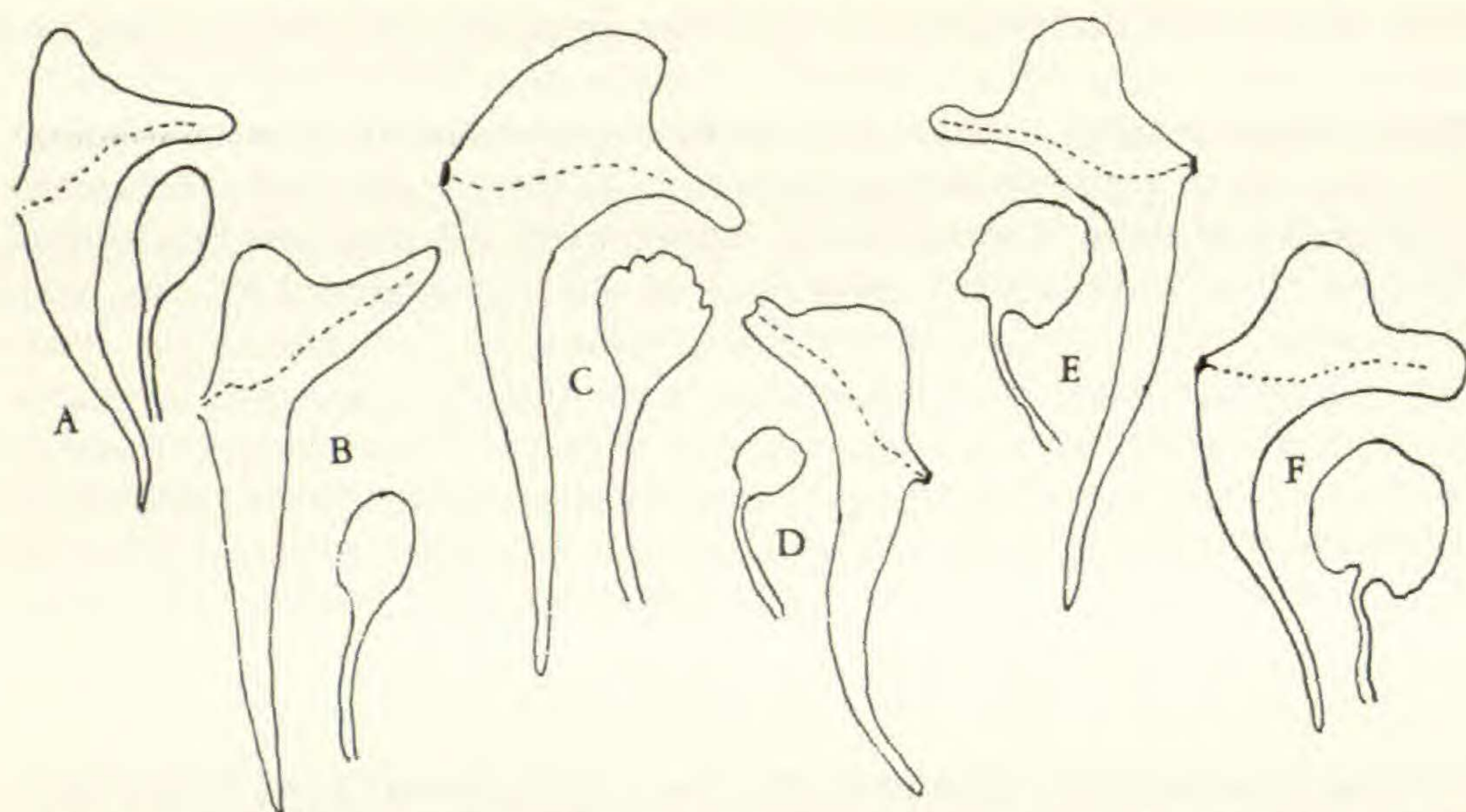


FIGURE 1. *Delphinium*, GROUP I. Petals, the upper spurred and with wing of lamina on side away from spur, the dotted line indicating position of main vein toward lamina tip. Lower petal clawed. A. *D. peregrinum*; spur 13 mm. long, lower petal 9 mm.; drawn from *Balansa* 728 (A). B. *D. virgatum*; spur 15 mm. long, lower petal 9 mm.; from *Marsh* in 1851 (MO). C. *D. nanum*; spur 18 mm. long, lower petal 12 mm.; from *Letourneux* in 1877 (M). D. *D. cinereum*; spur 12 mm. long, lower petal 7.5 mm.; from *Boissier* in 1842 (GH). E. *D. venulosum*; spur 18 mm. long, lower petal 10 mm.; from *Bornmüller* 3093 (BH). F. *D. davisii*; spur 15 mm. long; lower petal 8.5 mm.; from *Sintenis* 4979 (K).

DISTRIBUTION. Limestone hills to ca. 1000 m., southern Anatolia to Jordan and Lebanon.

REPRESENTATIVE COLLECTIONS. **Turkey:** Kara Da, *Little*; *Davis* 35701. **Lebanon:** *Kotschy* 227. **Jordan:** *Marsh* in 1851; *F. Meyers* 99.

3. *Delphinium nanum* DC. Syst. 1: 349. 1817.

FIG. 1, C.

*Delphinium peregrinum* ssp. *nanum* (DC.) Graebner in Asch. & Graebn. Syn. 5. 2: 701. 1929.

? *Delphinium peregrinum* var. *boissieri* Huth, Bot. Jahrb. 20: 475. 1895. Not typified.

? *Delphinium peregrinum* var. *subsaccatum* Huth, loc. cit. Not typified.

*Delphinium grandiflorum* Forsk. Fl. Aegypt. Arab. 212. 1775, not L., 1753.

Annual, widely and stiffly branched from base to subsimple, the branches simple or nearly so, more or less hirtellous or spreading-pubescent throughout or especially on the sepals, the hairs sometimes somewhat interwoven, plants 3–15 cm. high; lower leaves obovate in outline, broadly 3-lobed, long-cuneate at base, 4–6 mm. long, the lobes broad, undivided; main cauline leaves largely simple, narrowly oblanceolate, 1–2.5 cm. long, narrowed at base into a broad petiole, gradually reduced up the stems and sessile, the upper lanceolate, sessile, bractlike, 2–6 mm. long; racemes short, loose; flowers few; pedicels 1–5 mm. long; bracteoles 2, lance-linear, 3–4 mm. long; flowers bluish purple to brownish violet with yellow base;



lower sepals oblong-lanceolate, 6–7 mm. long, grayish tomentulose-pubescent; lateral pair subovate, 6–7 mm. long, with median strip of pubescence; dorsal sepal 6–7 mm. long, densely pubescent as is the horizontal or ascendant spur which is 3–4 mm. wide at base and 15–20 mm. long; petals pale, the upper pair glabrous, lamina winged on the side, 7–8 mm. long, 8–10 mm. wide; lower petals to ca. 1 cm. long, the blade roundish-oblong, ca. 4 mm. wide, narrowed to a linear claw 4 mm. long; stamens 5–8 mm. long, filaments apparently bluish; carpels 3, sparsely pubescent, to ca. 8 mm. long and 2 mm. wide, the beak an additional 2–2.5 mm.; seeds 1 mm. long, almost round, dark brown with very closely appressed overlapping scales.

TYPE: Near Alexandria, Egypt, *Delile*. An 1803 collection seen (BM).

DISTRIBUTION. From between Suez and Gaza, Egypt, *Bové*; otherwise in African Egypt.

ILLUSTRATION. TÄCKHOLM, *Students' Flora Egypt Pl.* 57. 1956.

4. *Delphinium cinereum* Boiss. *Diagn. I.* 1: 67. 1842. FIG. 1, D.

Erect annual, divaricately branched from near the base, 1.5–2 dm. tall, densely cinereous-strigose with retrorse hairs, the branches several, rather coarse, simple or few branched, stiff, leafy to the racemes; lower leaves tripartite, 1–2.5 cm. long, short-petioled, the parts cuneate, 3–5-fid, more or less strigose, 2–5 mm. broad; upper subsessile, 3-lobed; uppermost simple, passing into bracts 3–20 mm. long; flowers 5–12, rather closely placed; pedicels 2–5 mm. long, pubescent; the bracteoles 2, linear, 5–7 mm. long; flowers pale blue, densely pubescent; upper sepal 7–8 mm. long, the spur straight, horizontal, pubescent, ca. 10 mm. long, 3 mm. wide at base; lateral sepals 6 mm. long, oblong, pubescent along midrib, the margins hyaline; lower sepals more pointed, pubescent over whole outer surface; upper petals about as long as sepals, 4–5 mm. wide, broadly emarginate; lower petals ca. 7 mm. long, the limb rounded, abruptly narrowed into a slender claw; stamens almost equaling sepals, dilated and glabrous at base; carpels 3, cylindrical, closely parallel, hirsute-pubescent, 10–12 mm. long in maturity; seeds globose, umbilicate, the scales in rows.

TYPE: Turkey: "in collibus Lydia circa Laodiceam," *Boissier*, June, 1842, according to the original description. But in his *Fl. Orient.* 1: 86. 1867, *Boissier* said "Fl. July." The specimens seen (BM, GH, K, P), all give July, 1842, and I take them to be isotypes, the holotype being at Geneva.

COLLECTIONS SEEN. Turkey: Caria, *Pinard* in 1843; Cilicia, *Persnin* 170.

A rare and rather local endemic.

5. *Delphinium venulosum* Boiss. *Fl. Orient.* 1: 86. 1867. FIG. 1, E.

*Delphinium halteratum* Sibth. & Smith var. *venulosum* (Boiss.) *Finet & Gagnep.* *Bull. Soc. Bot. France* 51: 470. 1904.



Robust annual, 4–10 dm. tall, strigulose below, subglabrous above, with open ascending branches; stem leaves tripartite into broad segments, or the upper entire, elliptic-oblong, 3–20 mm. broad, subglabrous, 1–3 cm. long; those below the inflorescence deciduous by flowering time; racemes rather open, mostly several flowered; bracts linear or wider, 3–10 mm. long; pedicels strigulose, commonly 4–5 mm. long, bibracteolate; flowers violet-blue to deep blue-purple, the upper sepal ca. 7 mm. long, very finely strigulose, the spur straightish, subhorizontal, mostly ca. 1.5 cm. long, scarcely 3 mm. wide at base; lateral sepals narrowly oblong-ovate, ca. 7 mm. long, with strigulose median band; lower sepals lance-ovate, rather generally strigulose; upper petals apically blue, ca. 7 mm. wide; lower petals well exserted, ca. 9 mm. long, the rounded lamina abruptly contracted to a longer slender claw; stamens 5–6 mm. long; follicles 5–6 mm. long, 2.5 mm. thick, with a few scattered hairs; seeds rounded, the apex narrowed, deeply umbilicate.

TYPE: Turkey: "in cultis Cappadociae circa Caesaream," in 1856, *Balansa* 858; isotype seen (κ).

DISTRIBUTION. Inner Anatolia in fallow places below 1200 m.

ILLUSTRATION. DAVIS, Fl. Turkey 1: 129. fig. 2 (12). 1965.

REPRESENTATIVE SPECIMENS. Turkey: *Bornmüller* 2674, 3093, and 1529; *Sintenis* 4627; *Davis* 32782, 32778, 32813; *Uvarov* 98; *Khan, Prance & Ratcliffe* 759.

An endemic Turkish species.

6. *Delphinium davisii* Munz, nomen novum.

FIG. 1, F.

*Delphinium sintenisii* Freyn, Österr. Bot. Zeitschr. 43: 374. 1893, not Uechtr. (1880).

*Delphinium bithynicum* Davis, Notes Bot. Gard. Edinb. 26: 172. 1965, not Grisebach, 1839.

Plant 1–4 dm. tall, divaricately branched from base or middle, glabrous except for the strigulose pedicels and calyx; leaves round in outline, palmately parted, the segments cuneate, parted into mucronate lanceolate lobules 1–2.5 cm. long, 1–3 mm. wide; racemes densely few to many flowered, 5–15 cm. long; bracts simple, entire, lance-linear, 3–12 mm. long, mucronate, to ca. 1.5 mm. wide; pedicels 2–3-bracteolate, strict, 1–2 cm. long; bracteoles lanceolate, near middle of pedicel, 2–3 mm. long; sepals blue-violet, minutely strigulose, the upper sepal 9–11 mm. long, more or less oblong, rounded at apex; spur ascending, curved, ca. 15 mm. long, 3 mm. wide at base, subcylindric, rather blunt; lateral sepals oblong, 7 mm. long, 3 mm. wide, rounded at apex; lower sepals lance-ovate, 8 mm. long, obtuse; upper petals with blade 9.5 mm. long, bent at right angle to spur, the lateral wing broad, the apex entire, round-oblong, the spur 15 mm. long; laminae of lateral petals cordate-orbicular, 4 mm. in diameter, the glabrous claw 5 mm. long; stamens 5 mm. long, dilated at base, glabrous; anthers yellow, almost round, 1 mm. long; follicles erect, 3, short, oblong.



parallel, torulose, glabrous, veined, 7–9 mm. long, the beak an additional 2 mm.; seeds black, almost 2 mm. long, depressed spherical, transversely lamellate-rugose, the lamellae imbricate.

TYPE COLLECTION: Turkey: Paphlagonia near Kastemuni [Kastamboli] in valley Kara Dere near Kady Oghbi Chan, Aug. 15, 1892, *Sintenis* 4979; isotypes seen (BM, K).

DISTRIBUTION. Disturbed places, 850–950 m., edge of scrub, Paphlagonia and Bithynia.

REPRESENTATIVE COLLECTIONS. Bithynia: *Grisebach*. Paphlagonia: *Davis* 39053.

Related to *D. halteratum* of the western Mediterranean, but tending to be more glabrous vegetatively and on the follicles, the plant of lower stature, etc. It is a pleasure to name this Turkish species for Dr. Peter H. Davis in recognition of the contribution he has made to an understanding of the genus *Delphinium* in Turkey.

#### UNCERTAIN SPECIES

7. *Delphinium syncarpum* Freyn ex Stapf, Denkschr. Akad. Wien Math. Naturw. 51: 26. 1886. FIG. 2, E.

Simple erect, apparently annual, to ca. 2 dm. high, leafy, cinereous-strigulose and with short stiff spreading glandular hairs; lower petioles to ca. 1 cm. long; blades 8–12 mm. long, trisect, then again lobed into oblong, mucronate, obtusish parts to ca. 1 mm. wide; flowers few, in a close simple raceme; bracts commonly trifid, 5–8 mm. long; pedicels 3–6 mm. long; bracteoles linear, 2–3 mm. long, at about the middle of the pedicel; sepals white with upper midrib greenish, mostly elliptic, 8–9 mm. long, attenuate into a claw, the spur descending, ca. 8 mm. long; upper petals sepal-like, but without the green midrib, clawed, ca. 11 mm. long, apparently spurless, hence nectarless; lower petals with blade ca. 8 mm. long and wide, shortly 2-lobed, glabrous, the claw 4 mm. long; stamens 3.5–4.5 mm. long, the filaments broadly dilated, glabrous; anthers pale, 1 mm. long; follicles 3, hairy, united at the base.

TYPE: “ad portum Moschdiser,” northern Iran, legit *Th. Pichler* (WU); seen.

A very doubtful species. The type consists of a single one-stemmed plant, with a few broken flowers; the carpels are very undeveloped. The flowers seem abnormal, the upper petals apparently not spurred, sepal-like, but lacking the dorsal green midrib of sepals. I believe it is annual and has lower petals glabrous, hence must be in my Group I, although I first placed it in Group IV.

I have seen a collection from Luristan, Iran, namely *Koelz* 18519 (MICH), which may represent this species. It has no flowers; the follicles are united about half way.

I am very grateful to Professor Lothar Geitler, Botanical Institute,



University of Vienna, for his kindness in loaning me the type of *D. syncarpum*.

## GROUP II

Plants biennial. Leaves palmately 5–7-partite into entire or incised segments. Petals glabrous, the upper short clawed, not winged on the side. Seeds few, reticulate-foveolate, not squamate.

This group, in which three species are recognized in Europe (Tutin et al., *Fl. Europaea* 1: 216. 1964) is the same as Section *Staphisagria* DC. *Syst.* 1: 362. 1817, and Tribus *Staphisagria* Huth, *Bot. Jahrb.* 20: 481. 1895. In Asia there is one species.

### 8. *Delphinium staphisagria* L. *Sp. Pl.* 1: 531. 1753. FIG. 2, A.

*Staphisagria macrosperma* Spach, *Hist. Nat. Vég. Phan.* 7: 348. 1839.

Biennial, usually one stemmed, simple or few branched above, 3–12 dm. tall, leafy, soft-hairy with fine rather long spreading hairs and densely covered also with short retrorse hairs; leaves large, the blades rounded or broader, to 2 dm. in diameter, more or less finely strigose and with longer hairs, the usually 5–7 segments entire or 2- or 3-lobed, these ultimate divisions broadly lanceolate, sharply acute, 3-veined, often entire or with few large teeth; petioles mostly longer than blades, dilated at base, with both kinds of pubescence; racemes terminal, dense or lax, usually many flowered on the main stem, few flowered on branches; lower bracts foliose, 3-parted or entire, sessile or petioled, from half as long to as long as the pedicels which are 0.5–5 cm. long, densely hairy and strigose, bibracteolate near the base; flowers mostly deep blue, 2–3 cm. in diameter; calyx fine-hairy, the upper sepal oblong-ovate, 1–2 cm. long, the spur saccate, 2–3 mm. long and wide; lateral sepals ovate, ca. 15 mm. long, rounded at apex; lower sepals similar but slightly shorter; upper petals white or bluish, pubescent, obtuse, simple or some bilobed at summit, 10–12 mm. long, short-spurred at base; lower petals glabrous, subspatulate or obovate-cuneiform, somewhat asymmetrical, 14–16 mm. long; stamens 8–10 mm. long, ciliate above, glabrous and dilated below; carpels 3, long-pubescent, inflated, 12–20 mm. long at maturity; seeds few, 5–6 mm. long, blackish, obpyramidal, 3-angled, reticulate-foveolate.

TYPE LOCALITY: Described from Istria, Dalmatia, Calabria, Apulia, S. France (LINN. 694/12).

DISTRIBUTION. Found mostly in woods and waste rocky places below 300 m., Mediterranean region from southern Europe and Morocco to Turkey, Syria, etc.

ILLUSTRATIONS. SIBTHORP & SMITH, *Fl. Graeca* 6: *t.* 508. 1826; COSTE, *Fl. France* 1: 51. 1901; MAIRE, *Fl. de l'Afrique du Nord* 11: 84. *fig.* 39. 1964.

REPRESENTATIVE SPECIMENS. Turkey: *Persnin* 1; *Sintenis* 444; *Little* 52. Syria: *Egger* 68; *Haradjian* 2138.



## GROUP III

Leafy annuals with leaves subpinnate into more or less ovate, cuneate segments. Petals glabrous, the upper sessile, with a wing opposite the spur so as to appear bilobulate. Lower petals more or less deeply divided. Seeds with a spiral band of 5–6 turns of confluent scales.

This group is the section *Anthriscifolium* W. T. Wang, Acta Bot. Sinica 10: 277. 1962, and is quite distinct in its characters. It ranges widely over China. As I understand it, it consists of a single variable species, varying in length and coarseness of spur, flower size, size of leaf lobules, lobing of both pairs of petals, slenderness, and shape of follicles. Occasional plants lack spur and petals (*H. B. Morse* 553, Lungchow, Kwangsi (NY). Variations do not seem to be geographic and I am treating them simply as varieties.

9. *Delphinium anthriscifolium* Hance, Jour. Bot. 6: 207. 1868.

Annual, the stems rather slender, more or less flexuous, grooved when dry, simple to openly branched, mostly 1–7 dm. tall, subglabrous below to short- or long-retrorse-strigulose, more densely so above, sometimes with some spreading hairs; stems leafy almost to the inflorescence, the basal leaves gone by anthesis, the cauline little reduced upward, petioled, ternate, the 3 main divisions short petiolulate, becoming pinnate into several more or less ovate cuneate segments 1–3 cm. long and in turn pinatifid into few to several lanceolate lobules usually 2–3 mm. wide, the terminal acuminate; leaf blades commonly 3–10 cm. long, somewhat strigulose; inflorescence short- to long-pedunculate, rather few flowered, racemose; bracts from tripartite to simple and linear, mostly 3–10 mm. long; pedicels about as long as the flower; bracteoles linear, usually near the middle of the pedicel; flower violet to blue; upper sepal 5–11 mm. long, 1.5–3 mm. wide, usually acute, pubescent, usually spurred, the spur 5–22 mm. long, rather straight, very slender to somewhat coarse; lateral sepals asymmetrical, more or less unguiculate, 5–10 mm. long, 3–6 mm. wide; quite membranous near the edges; lower sepals more elliptic, 2.5–4.5 mm. wide; petals often purplish or veined with purple, glabrous, the upper with the lamina 7–11 mm. long, winged on one side and appearing bilobed, with a spur mostly 5–20 mm. long; lower petals somewhat asymmetrical, usually deeply 2-lobed, sometimes only emarginate, unguiculate, the lamina 4–5 mm. long, the claw 3.5–5 mm. long; stamens unequal, 3.5–7 mm. long, the filaments glabrous, not strongly dilated below; anthers usually dark, 0.6–0.8 mm. long; follicles 3, rarely 5, inflated, divergent, usually rather abruptly narrowed at apex, 8–14 mm. long, 3–4.5 mm. wide, the style slender, 2–3 mm. long; seeds brownish, almost 2 mm. long, with a spiral band of 5–6 turns of confluent scales.

Spur often longer than sepals, 10–22 mm. long; sepals 9–11 mm. long. . . . .  
 . . . . . Var. *anthriscifolium*.  
 Spur often equal to sepals, shorter than above.



The spur 7–10 mm. long; sepals mostly 6–8 mm. long. . . . . Var. *callerii*.  
 The spur 5 mm. long; sepals ca. 5 mm. long. . . . . Var. *savatieri*.

***Delphinium anthriscifolium* Hance var. *anthriscifolium*. FIG. 2, B.**

*Delphinium anthriscifolium* Hance, Jour. Bot. 6: 207. 1868.

? *Delphinium anthriscifolium* var. *majus* Pamp. and var. *ramosum* Pamp. Nouv. Giorn.-Bot. Ital. (n.s.) 22: 288. 1915.

*Delphinium cavaleriense* Lév. & Vaniot, Bull. Acad. Geogr. Bot. 11: 49. 1902 and 15: 711. 1905. Type, *Cavalerie* 2344 from Pin-fa do Lofou (E, K) seen.

*Delphinium cerefolium* Lév. & Vaniot, Bull. Acad. Geogr. Bot. 11: 49. 1902. Type, *Chaffanjon*, June 2, 1898, Mont du College, Kouy-Tcheou (E), seen. Cf. Lauener & Green, Notes Bot. Gard. Edinb. 23: 584. 1961.

Flowers usually several; sepals 9–11 mm. long; spur 10–22 mm. long.

LECTOTYPE: "prope rupem calcaream Kai-kun-shek," Kwantung prov., China, June, 1867, *Sampson*, Hance no. 10125 (holotype K; isotypes BM, GH); chosen since original description mentions this collection as having "afforded excellent material for the above diagnosis."

DISTRIBUTION: Widely distributed in China.

REPRESENTATIVE COLLECTIONS. **Hupeh:** *Henry* 5862, 1348, 1966; *Wilson* 95; *H-Ch'ang Chow* 89; *Watters* in 1879. **Szechwan:** *Fang* 758; *Farges* 1146, 1441, 1440; *Faber* 725; *Yang* 58311. **Anhwei:** *Fan & Li* 98. **Yunnan:** *Tsai* 50809; *Cavalerie* 2957. **Hunan:** *Handel-Mazzetti* 11802. **Fukien:** *Metcalf & Chang* 797; *Tang Siu Ging* 13795. **Kwangtung:** *Chun* 6276; *Lamont* 1065.

***Delphinium anthriscifolium* Hance var. *callerii* (Franchet) Finet & Gagnep. Bull. Soc. Bot. France 51: 471. 1904. FIG. 2, C.**

*Delphinium callerii* Franchet, Bull. Soc. Linn. Paris 1: 329. 1882; Bull. Soc. Philom. Paris 5: 161. 1893.

*Delphinium exiguum* E. Pritz. ex Diels, Bot. Jahrb. 29: 327. 1900. Type from Szechwan: Nan ch'uan, *von Rosthorn* 2022; not seen.

*Delphinium robertianum* Lév. & Vaniot, Bull. Acad. Geogr. Bot. 11: 49. 1902. Type, near Kauy Yang, Kwangtung, Sept. 12, 1897, *Bodinier* ? (E); seen.

*Delphinium minutum* Lév. & Vaniot, Bull. Herb. Boiss. II. 6: 505. 1906. Based on *Esquirol* 24, Kouy-tchéou (printed as 23 in original description) (E, K, UC); seen. Cf. Lauener & Green, Notes Bot. Gard. Edinb. 23: 584. 1961.

*Delphinium kweichowense* W. T. Wang, Acta Bot. Sinica 10: 283. 1962. Based on *Y. Tsiang* 8571 from Tenfan, Kweichow. Seen (NY, US). Somewhat intermediate between vars. *anthriscifolium* and *callerii*.

Flowers one to few; sepals mostly 6–8 mm. long; spur 7–10 mm. long.

TYPE: Near Macao, China, *Callery* 6, in 1841 (P), photo. (E), seen; and *Callery* 51, in 1844, photo. (E), seen.

RANGE. Widely distributed in China.



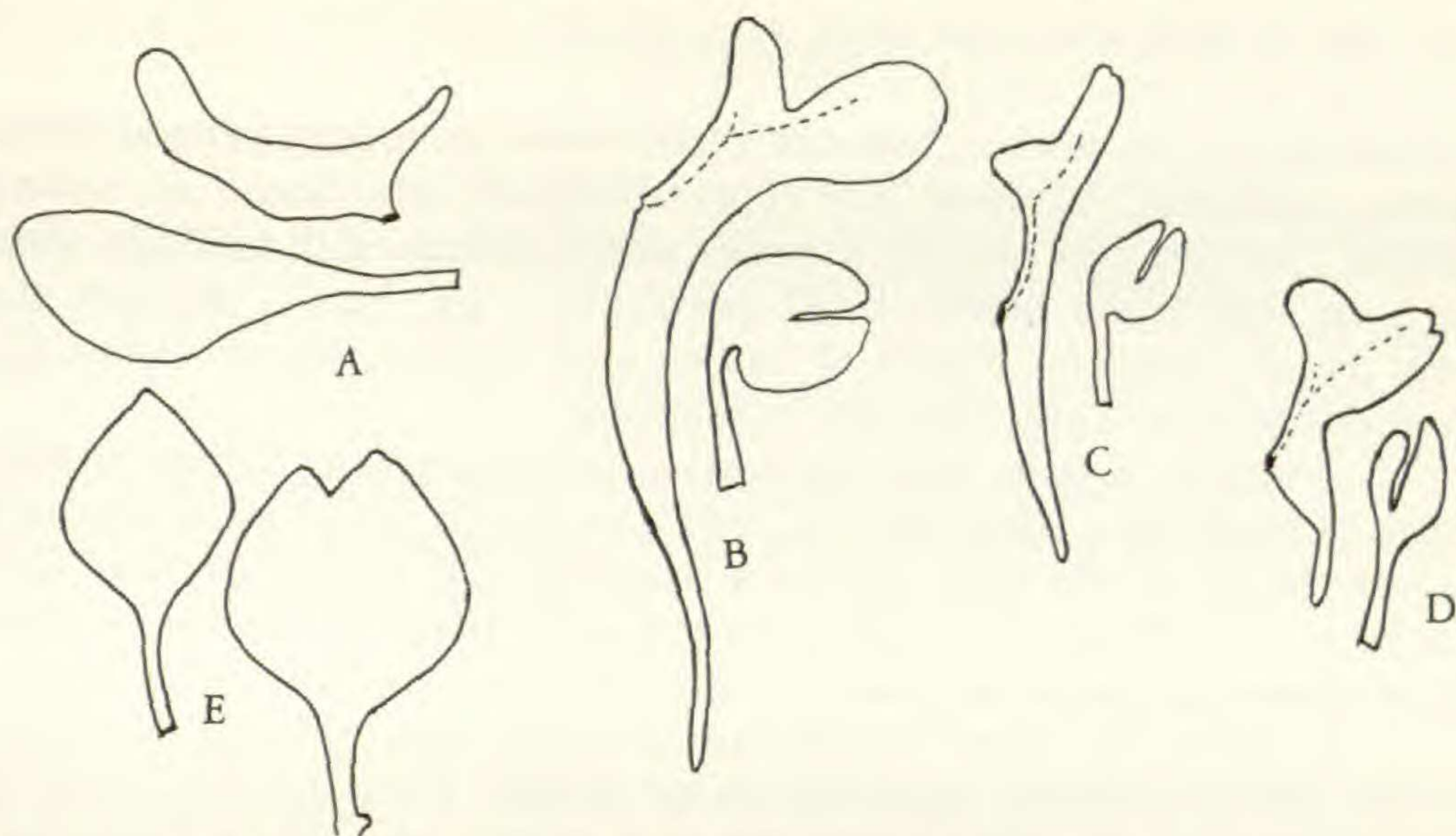


FIGURE 2. *Delphinium*, GROUP II. Petals, the upper with short spur to upper right, the lower asymmetrical. A. *D. staphisagria*; upper petal 10 mm. long, lower 16 mm.; drawn from *Alleizetti* May 1, 1853 (MO).

GROUP III. Upper petal with a wing opposite the base of the spur. B. *D. anthriscifolium* var. *anthriscifolium*; upper lamina 11 mm. long, lower lamina 5 mm. long; drawn from *Henry* 5862 (GH). C. *D. a.* var. *callerii*; lamina of upper petal 9 mm. long, of lower petal 4 mm. long; drawn from *Cavalerie* 2822 (UC). D. *D. a.* var. *savatieri*; lamina of upper petal 7.5 mm. long, of lower petal 4.5 mm. long; drawn from *Beach* 20 (US).

GROUP I. E. *D. syncarpum*; lamina of upper petal 7 mm. long, claw 4 mm.; lamina of lower petal 8 mm. long and wide; drawn from *Pichler*, Moschdiser (UW).

REPRESENTATIVE SPECIMENS. Szechwan: *Henry* 7263; *Wang* 20450; *Sun* 1765; *Fang* 12258; *Chien* 5877. Kiangsu: *Feng* 112; *Schindler* 275 C; *Stewart* 2071; *Merrill* 11429; *Keng* 1311; *Pei* 2646. Fukien: *Dunn* 2321; *Chung* 2602. Kwangtung: *Cavalerie* 2169, 2822. Chekiang: *Barchet* 11; *Ching* 1363; *Bullock* 7. Anhwei: *Ching* 8442.

*Delphinium anthriscifolium* Hance var. *savatieri* (Franchet) Munz, comb. nov. FIG. 2, D.

*Delphinium savatieri* Franchet, Bull. Soc. Linn. Paris 1: 330. 1882; Bull. Soc. Philom. Paris 5: 162. 1893.

Sepals ca. 5 mm. long; spur ca. 5 mm. long, subconic.

TYPE: China: Chekiang: "in siccis ad pedem montium Shao-Shin, prope Ning-po," May, 1863, *Lud. Savatier* (P?); not seen.

REPRESENTATIVE SPECIMENS. Less common than the other two forms. Kiangsu: *Teng* 153; *Chang* 386. Chekiang: *Kay Beach*; *Keng* 580. Hupeh: *Henry* 200, 760. Anhwei: *Bullock* 10125 (BM), cited by Hance as *D. anthriscifolium*. A spurless form seen from Hupeh: *Morse* 553 (K, NY).



## GROUP IV

Plants perennial, with a cluster of short, tuberous, mostly vertical roots. Leaves palmatifid, at least the upper dissected into linear or oblong laciniae. Inflorescence usually a rather dense raceme with pedicels short (to 1 cm. long) and flowers small (sepals to 1 cm. long). At least the lower petals bearded. Plants of rather arid regions, largely from the Mediterranean to Turkestan and Afghanistan.

This group is in large part the Section DIEDROPETALA, Tribus *Macrocentra* of Huth, Bot. Jahrb. 20: 341. 1895; or, in the text of his monograph on later pages of the same reference, it would fall into his Tribus *Giberula*, p. 423, Tribus *Lasiocarpa*, p. 428, and Tribus *Leiocarpa*, p. 439. All of these categories proposed by him, however, include other species not in my Group IV. Since the fifty species which I recognize in this group do not fall into readily separable minor groups, I am treating them in alphabetical order, hoping that in this way their study will be facilitated.

## KEY TO SPECIES

1. Bracts broad, ovate-lanceolate.
  2. Bracts longer than the pedicels.
    3. Stems terete below; sepals whitish to yellowish or pale blue; spur 8–10 mm. long. Northern Anatolia to Bulgaria. . . . . 10. *D. albiflorum*.
    3. Stems angled and sulcate below; sepals bluish; spur 10 mm. long. Upper Euphrates. . . . . 20. *D. dasystachyum*.
  2. Bracts equaling pedicels; sepals bluish white to pale rose; spur 15 mm. long. Syria to Jordan, Israel. . . . . 27. *D. ithaburensense*.
1. Bracts narrower, mostly linear.
  4. Spur definitely longer than its sepal blade.
    5. Sepals bluish to purple, occasionally rose.
      6. Stems strigulose with closely appressed hairs.
        7. Flowers purplish blue.
          8. Sepals strigulose; spur 10–15 mm. long; blade of lower petal longer than wide. Iraqui Kurdistan. . . . . 37. *D. micranthum*.
          8. Sepals with scattered spreading hairs; spur 20 mm. long; blade of lower petal about as wide as long. Afghanistan. . . . . 52. *D. tetanoplectrum*.
        7. Flowers pale blue to smoky gray.
          9. Stem subglabrous below, strigulose above; lower petioles only subvaginate at base; spur usually curved; carpels hirsute-pubescent. Turkish Kurdistan. . . . . 21. *D. dolichostachyum*.
          9. Stem strigulose throughout; lower petioles strongly vaginate; spur straight; carpels strigulose.
            10. Bracteoles 3–6 mm. long, near the middle of the pedicel.
              11. Upper petals glabrous at tip; spur 16–20 mm. long, the upper sepal ca. 12 mm. long. Tauria. . . . . 40. *D. pallasii*.



11. Upper petals often with some hairs at tip; spur 12–15 mm. long, the upper sepal 8–10 mm. long. Northern Iran. . . . . 53. *D. tuberosum*.
10. Bracteoles 1.5–3 mm. long, near the flower.
  12. Upper petal notched at apex; spur 10–15 mm. long. Afghanistan, western Himalaya. . . . . 50. *D. suave*.
  12. Upper petal entire; spur 17 mm. long. Turkestan. . . . . 13. *D. batalinii*.
6. Stems glabrous or with spreading hairs (at least above).
  13. Sepals essentially glabrous, sometimes with minute puberulence near the tip.
    14. Lower leaves with broad primary lobes (1 cm. or wider), some usually still evident at anthesis; sepals violet blue, the spur 11–12 mm. long.
      15. Spur of upper petals ca. 3.5 mm. wide at base, 12 mm. long; lobes of lower petals lanceolate. Northern Iran. . . . . 12. *D. aquilegifolium*.
      15. Spur of upper petals 2 mm. wide, 9 mm. long; lobes of lower petals oblong-ovate. Southern Iran. . . . . 46. *D. saniculifolium*.
    14. Lower leaves with mostly narrower lobes and largely withered by anthesis.
      16. Sepals pale blue, ca. 8 mm. long; spur 15 mm. long; bracts 5–8 mm. long. Turkey. . . . . 22. *D. fissum*.
      16. Sepals dark blue, 9–10 mm. long.
        17. Bracts 3–5 mm. long; spur 11–13 mm. long. Turkestan. . . . . 34. *D. longipedunculatum*.
        17. Bracts 8–12 mm. long; spur 14–15 mm. long. Tean Shan, middle Asia. . . . . 11. *D. albomarginatum*.
  13. Sepals with hairs on the outside.
    18. Upper parts of plant not glandular; sepals 8–10 mm. long. Persian Kurdistan. . . . . 44. *D. quercetorum*.
    18. Upper parts of plant with some glandular hairs.
      19. Spur steeply ascending; carpels glabrous; racemes elongate. Caucasus and beyond. . . . . 47. *D. schmalhausonii*.
      19. Spur more or less horizontal.
        20. Sepals pale blue.
          21. Carpels subglabrous; lower petals not exceeding sepals.
            22. Spur curved at apex, about twice as long as sepals. Hamadan, Iran. . . . . 53. *D. tuberosum*.
            22. Spur straight, about one and one-half times as long as sepals. Mascate, Iran. . . . . 42. *D. penicillatum*.
          21. Carpels pubescent; lower petals exceeding sepals. Persian Kurdistan. . . . . 44. *D. quercetorum*.



- 20. Sepals violet-blue to deep blue.
- 23. Spur 9–10 mm. long, the upper sepal 5–6 mm. long; upper stem glabrous below the inflorescence; carpels glabrous. Tean Shan, middle Asia. . . . . 11. *D. albomarginatum*.
- 23. Spur mostly 12–20 mm. long, the upper sepal 6–10 mm. long.
- 24. Stem 1–7 dm. tall; upper sepal 6–10 mm. long.
- 25. Spur 11–17 mm. long.
- 26. Pedicels 5–7 mm. long; stem 1.5–2 dm. tall. Kastamonu, Turkey. . . . 25. *D. ilgazense*.
- 26. Pedicels mostly 8–20 mm. long.
- 27. Sepals 9–13 mm. long. Turkish Kurdistan. . . . .
- . . . 16. *D. carduchorum*.
- 27. Sepals 6–9 mm. long. Afghanistan. . . . .
- . . . 31. *D. latesquamatum*.
- 25. Spur 16–22 mm. long; upper sepal 8–10 mm. long; pedicels 7–10 mm. long, Transcaspia. . . . .
- . . . . . 54. *D. turkmemum*.
- 24. Stem ca. 1 m. tall; upper sepal 10 mm. long.
- 28. Racemes long-cylindrical; bracts divided into linear lobes; follicles glabrous. Caucasus. . . . .
- . . . . . 47. *D. schmalhauseni*.
- 28. Racemes rather few flowered; bracts simple; follicles hairy. Afghanistan. . . 17. *D. centeteroides*.
- 5. Sepals yellowish to white.
- 29. Spur descending; young carpels united at base, hairy. Iran. (See Group I). . . . . 7. *D. syncarpum*.
- 29. Spur horizontal or erect; carpels separate.
- 30. Ultimate divisions of upper leaves 8–20 mm. wide; spur horizontal; carpels glabrous. Kurdistan. . . . .
- . . . . . 30. *D. kurdicum*.
- 30. Ultimate divisions of upper leaves 1–7 mm. wide; spur sub-erect.
- 31. Sepals glabrous; spur erect. South of Caucasus. . . . .
- . . . . . 39. *D. ochroleucum*.
- 31. Sepals pubescent.
- 32. Ultimate lobules of leaves 2–7 mm. wide; lobules at tip of upper petal 2–3 mm. long.
- 33. Calyx short-pilose without; upper sepal 9 mm. long; spur 10–12 mm. long. Daghestania. . . . .
- . . . . . 35. *D. macropogon*.
- 33. Calyx strigulose without; upper sepal 11–12



- mm. long; spur 13–15 mm. long. Turkestan.  
 ..... 14. *D. biternatum*.
32. Ultimate lobules of leaves 0.5–2 mm. wide; upper sepal ca. 8 mm. long, the spur 13 mm. Transcaucasia. .... 51. *D. szowitsianum*.
4. Spur not definitely longer than upper sepal blade.
34. Flowers white to yellowish.
35. Stems with spreading hairs in upper parts; sepals with long yellow or white hairs; follicles hairy. Armenia. .... 33. *D. longebracteatum*.
35. Stems glabrous or strigulose above, except on some pedicels.
36. Sepals glabrous; carpels glabrous. Turkestan. .... 48. *D. semibarbatum*.
36. Sepals not glabrous; carpels usually pubescent or hirsute.
37. Pedicels strigose, not glandular; upper petals bidentate. Daghestan. .... 35. *D. macropogon*.
37. Pedicels more or less glandular.
38. Upper petal entire; sepals puberulent; spur 9–12 mm. long. Iran. .... 23. *D. gorganicum*.
38. Upper petals bilobulate; sepals strigulose; spur 12–15 mm. long. Turkestan, Iran. .... 14. *D. biternatum*.
34. Flowers blue or bluish to rose or greenish.
39. Sepals glabrous without or nearly so.
40. Inflorescence with some glandular hairs.
41. Lamina of lower petals deeply divided into 2 more or less toothed lobes ca. 1 mm. wide, hairy; sepals 8–9 mm. long; spur 10–11 mm. long. Asia Media. .... 26. *D. inopinatum*.
41. Lamina of lower petals not as above.
42. Spur suberect; ultimate divisions of upper leaves 1–2.5 mm. wide.
43. Carpels strigose. Kurdistan. .... 57. *D. vanense*.
43. Carpels glabrous. Armenia. .... 41. *D. pallidiflorum*.
42. Spur horizontal; ultimate divisions of leaves 2.5–5 mm. wide. Afghanistan. ... 38. *D. nuristanicum*.
40. Inflorescence without glandular hairs.
44. Upper sepal 7–8 mm. long.
45. Upper petals with a few hairs at the tip; lower petals completely covered with long hairs. Middle Asia. .... 15. *D. bucharicum*.
45. Upper petals glabrous; lower petals with few short hairs in distal part.
46. Spur of upper petals ca. 3.5 mm. wide, 12 mm. long; lobes of lower petals lanceolate. Northern Iran. .... 12. *D. aquilegifolium*.
46. Spur of upper petals 2 mm. wide, 9 mm. long; lobes of lower petals oblong-ovate. Southern Iran. .... 46. *D. saniculifolium*.



- 44. Upper sepal 10–16 mm. long.
  - 47. Flowers pale rose; plant glabrous throughout. Israel. . . . . 18. *D. chodatii*.
  - 47. Flowers blue or violet.
    - 48. Racemes dense, elongate, many flowered; sepals deep violet. Kurdistan. . . . . 36. *D. macrostachyum*.
    - 48. Racemes lax.
      - 49. Sepals deep blue; lower petals hairy. Kurdistan. . . . . 57. *D. vanense*.
      - 49. Sepals sordid-lilac; lower petals almost glabrous. Asia Media. . . . . 49. *D. semiclavatum*.
- 39. Sepals with some pubescence.
  - 50. Bracts inflated at base and with long narrow terminal lobes. Turkey. . . . . 20. *D. dasystachyum*.
  - 50. Bracts not as above.
    - 51. Pedicels with some spreading hairs.
      - 52. Spur curved into a terminal hook; sepals bluish purple, sparsely villous. Western Himalaya. . . . . 55. *D. uncinatum*.
      - 52. Spur not hooked at end.
        - 53. Sepals intense blue to dark blue-violet, 7–13 mm. long.
          - 54. Plant 26–60 cm. tall; sepals appressed-pubescent. Turkish Kurdistan. . . . . 16. *D. carduchorum*.
          - 54. Plant 16–20 cm. tall; sepals viscid-pubescent. Kastamonu, Turkey. . . . . 25. *D. ilgazense*.
        - 53. Sepals paler, the upper sepal 12 mm. long; carpels glabrous. Turkish Armenia. . . . . 41. *D. pallidiflorum*.
    - 51. Pedicels with closely appressed hairs.
      - 55. Axis of inflorescence glabrous; sepals 10–11 mm. long; spur spreading-upcurved, 12 mm. long. Turkestan. . . . . 28. *D. karategini*.
      - 55. Axis of inflorescence more or less pubescent.
        - 56. Upper sepal 6–9 mm. long.
          - 57. Racemes to ca. 10-flowered, rather open; spur 5–7 mm. long; upper petal-blade with some hairs. Himalaya. . . . . 29. *D. kohatense*.
          - 57. Racemes 20- or more-flowered; spur 8–10 mm. long; upper petal-blade glabrous or nearly so.
            - 58. Raceme dense; spur 8 mm. long. Iran. . . . . 56. *D. ursinum*.
            - 58. Raceme open; spur 10 mm. long. East Afghanistan. . . . . 24. *D. griseum*.
  - 56. Upper sepal 10–13 mm. long.
    - 59. Flowers blackish violet-purple; petals



- purple. Georgia to the Volga River. . . .  
 . . . . . 43. *D. puniceum*.
59. Sepals bluish; petals lilac.
60. Lamina of lower petals longer than wide.
61. Ultimate leaf segments 1–2 mm. wide; lamina of lower petals oblong, with 2 lanceolate divergent lobes. Russian Armenia, Transcaucasia. . . . .  
 . . . . . 32. *D. laxiusculum*.
61. Ultimate leaf segments 2–3 mm. wide; lamina of lower petals elliptic, with 2 broader parallel lobes. Southern Iran. . . . .  
 . . . . . 19. *D. cyphoplectrum*.
60. Lamina of lower petals roundish, lobed ca. 3 mm. Western Himalaya. . . . .  
 . . . . . 45. *D. roylei*.

10. *Delphinium albiflorum* DC. Syst. Nat. 1: 353. 1817. FIG. 3, A.

*Delphinium hybridum* Steph. ex Willd. var. *albiflorum* (DC.) Koch, Linnaea 15: 247. 1841.

*Delphinium ochroleucum* auct. non Stev. ex DC.

*Delphinium ponticum* Hausskn. & Bornm. Österr. Bot. Zeitschr. 40: 211. 1890. Based on *Bornmüller* 972 from Amasia, Mt. Sana Dagħ (BM, K, P). Seen.

*Delphinium albiflorum* var. *candolleanum* Huth, Bot. Jahrb. 20: 439. 1895. Not typified.

*Delphinium albiflorum* var. *eginense* Huth, Bot. Jahrb. 20: 439. 1895. Based on *Sintenis* 1890 from Egin, Armenia. Not seen.

Stem terete, 5–6 dm. tall, 2–5 mm. thick, simple, glabrous or glandular-pubescent above, glabrous and somewhat angled below; leaves petioled, multipartite into acute long linear lobes 1–3 mm. wide, the petioles strongly dilated at their base; lower leaf blades 4–7 cm. broad, strigose; racemes crowded, elongate, many flowered, pubescent or glabrous; bracts membrane margined, white to pale blue, broadly lanceolate, acuminate, longer than the pedicels; bracteoles membranaceous, 3–4 mm. long and just below the flowers; median pedicels shorter than the sepals, mostly ca. 5 mm. long; flowers, including spur, 19–22 mm. long; sepals white, or nearly so, to yellowish or pale blue, glabrous or pubescent; upper sepal oblong-ovate, 7–8 mm. long, the spur straight, horizontal, obtuse, 8–10 mm. long, 2–2.5 mm. wide at base; lateral sepals oblong, 8–10 mm. long, 3–4 mm. wide, rounded at apex, with greenish midrib; lower sepals ovate, obtuse, ca. 8 by 5 mm.; upper petals glabrous, bluish, bilobed, the lamina somewhat oblique, ca. 9 mm. high and with 2 short rounded apical lobes; the spur ca. 10 mm. long; lower petals bifid, the lobes subacute, unequal, bearded, the lamina 6 mm. long, elliptic rounded in outline, the claw 5 mm. long; stamens 5–6.5 mm. long, the upper part of the filaments bluish or



whitish; anthers yellowish or blue, roundish, 0.6 mm. in diameter; follicles 3, pubescent, erect, ca. 8 mm. by 2.5 mm., the beak an additional 2–2.5 mm.

TYPE: Armenia, *Tournefort* (P). Seen.

DISTRIBUTION. Northern Anatolia, Turkey at 1800 to 2100 m., growing on limestone.

ILLUSTRATION. DELESSERT, *Icon. Pl.* 1: t. 58. 1820.

REPRESENTATIVE COLLECTIONS. *Paphlagonia*: *Sintenis* 4883; *Kars*: *Davis* 30593; *Tunceli*: *Davis* 31305; *Agri*: *Furse* 3654; *Erzerum*: *Furse* 3785; *Armenia*: *Calvert & Zohrab* 1347.

A species characterized by its broad bracts.

11. *Delphinium albomarginatum* Simonova, *Key Pl. Environ. Tashkent*, ed. Popov, 124. 1924.

*Delphinium karataviense* Pavlov, *Bull. Soc. Nat. Mosc. sect. Biol.* [Mosk. Obschch. Isp. Pri. Biol.] II. 47: 80. 1938. Described as having *D. albomarginatum* as a synonym.

Stem 8–15 dm. tall, branched and glabrous above, with short white unequal hairs below; lowest leaves long petioled, strongly widened at the base, still present at time of flowering, when the laminae fall away; laminae trifid, the lobes unequally palmate; upper leaves less divided; flowers in a dense long raceme; lower bracts longer than the flower, the upper narrow-linear and equal to it; pedicels not more than half as long as the calyx; bracteoles near the middle of the pedicel or lower; sepals dark violet-blue, 9–10 mm. long, glabrous; spur almost one and one-half times as long as the sepals, straight; petals white, the upper notched; lower ciliate, but glabrous on the surface.

TYPE: Middle Asia, from Humsana in Umganski Mts. Type at Tashkent, but I was unable to see it or any other material. Apparently this plant is endemic in the western part of the Tean Shan region.

12. *Delphinium aquilegifolium* (Boiss.) Bornm. *Bull. Herb. Boiss.* II. 4: 1083. 1904, reprinted as *Fl. Elbursgeb. N.-Persiens* 11. 1904.

FIG. 3, B.

*Delphinium saniculifolium* Boiss. var. *aquilegifolium* Boiss. *Fl. Orient.* 1: 91. 1867.

*Delphinium aquilegifolium* var. *hebecarpum* Bornm. *Bull. Herb. Boiss.* II. 4: 1085. 1904, reprinted as *Fl. Elbursgeb. N.-Persiens* 13. 1904. Based on *Bornmüller* 6062, May 29, 1902, N. Persia, mts. Schimran. Seen (BM, P).

? *Delphinium aquilegifolium* vars. *glandulosissimum*, *longipedunculatum* and *violaceum* Bornm. *loc. cit.*

Stem more or less zigzag, 3–6 dm. tall, openly few branched, subglabrous except for small areas on one side of the pedicels or all the way around with dense spreading gland-tipped hairs inflated at the base; basal leaves



palmately 3–5-lobed into broad obovate parts 1–2 cm. wide or shallowly lobed and toothed at the apex, the blades 3–4 cm. wide, subreniform in outline, subglabrous, on petioles 3–10 cm. long, vaginate at base; cauline leaves few, more deeply dissected into parts with lance-linear lobes; inflorescence an open panicle of ca. 5–20 flowers in rather lax racemes; bracts lance-linear, 3–5 mm. long; pedicels elongating in fruit, ascending and becoming 1–3 cm. long, with 2–3 linear bracteoles ca. 2 mm. long and near the middle; flowers violet-blue; sepals glabrous or pubescent, the upper sepal ovate, 8 mm. by 3 mm., subacute, the spur 11–12 mm. long, 3 mm. wide at the base, somewhat attenuate at the apex; lateral sepals 7 mm. by 3 mm., oblong-elliptic, rounded at the tip; lower sepals 8 mm. by 4 mm., elliptic, obtuse; blade of upper petals oblique, ca. 8 mm. long, short-lobed at the apex, the spur ca. 12 mm. long; lower petals ca. 8 mm. long, the claw 4 mm., the broadly elliptic-oblong blade 4 mm. long, lobed to ca. 2.5 mm., ciliate in the cleft and more or less bearded on the surface; stamens 4–5 mm. long, subglabrous; anthers bluish, 0.7 mm. long; follicles 3, divergent, pubescent, to ca. 10 mm. by 4 mm., the styles an additional 2 mm.

LECTOTYPE: northern Iran, Mount Elbrus near Derbend, *Kotschy* 239 (holotype undoubtedly at G; isotypes seen at A, BM, K, P).

DISTRIBUTION. At 1900–2500 m., northern Iran and western Pakistan.

REPRESENTATIVE COLLECTIONS. Iran: *Rechinger* 3838; *Bornmüller* 6060; *Furse* 2627; *Trott* 887; *Furse & Syngé* 329 and 330; *Koelz* 18257; *W. O. Douglas* 236. W. Pakistan: Chitral, *Bowes Lyon* 25; Swat, *Stewart & Rahman* 25229.

The species is distinguished by the broad basal lobes and is near *D. saniculifolium*, but with broader, somewhat longer petal-spur and more sharply pointed lobes on the lower petals. *D. saniculifolium* is a species of southern Iran.

13. *Delphinium batalinii* Huth, Bot. Jahrb. 20: 432. pl. 8. 1895.

FIG. 3, C.

Stem erect, slender, subsimple, 2.5–7 dm. tall, short-strigulose throughout, scattered-leafy throughout; petioles dilated at base, 2–5 cm. long, ascending; leaves palmately parted into ultimate broad oblong lobes, the lower blades 2–3 cm. wide, the upper gradually widened from the petiole and with several lanceolate to sublinear ultimate lobes ca. 1 cm. long and 2–4 mm. wide; inflorescence racemose, branched at base or simple, elongate, with rather many, not crowded flowers; bracts all entire, the lower oblong-lanceolate, the upper linear, 5–8 mm. long; pedicels erect, adpressed to the axis, 10–15 mm. long, strigulose; bracteoles 2, linear, near the flower or more often 1/3–1/4 way below it, ca. 2 mm. long; flowers dilute blue; sepals strigulose, the upper sepal round-ovate, 9 mm. by 7 mm., apiculate, the spur straight, 17 mm. long, 3 mm. wide at the base; lateral sepals round-ovate, ca. 8 mm. long; lower sepals ca. 8 mm. by 5 mm.; upper petals yellowish or tinged blue, the lamina ca. 7 mm.



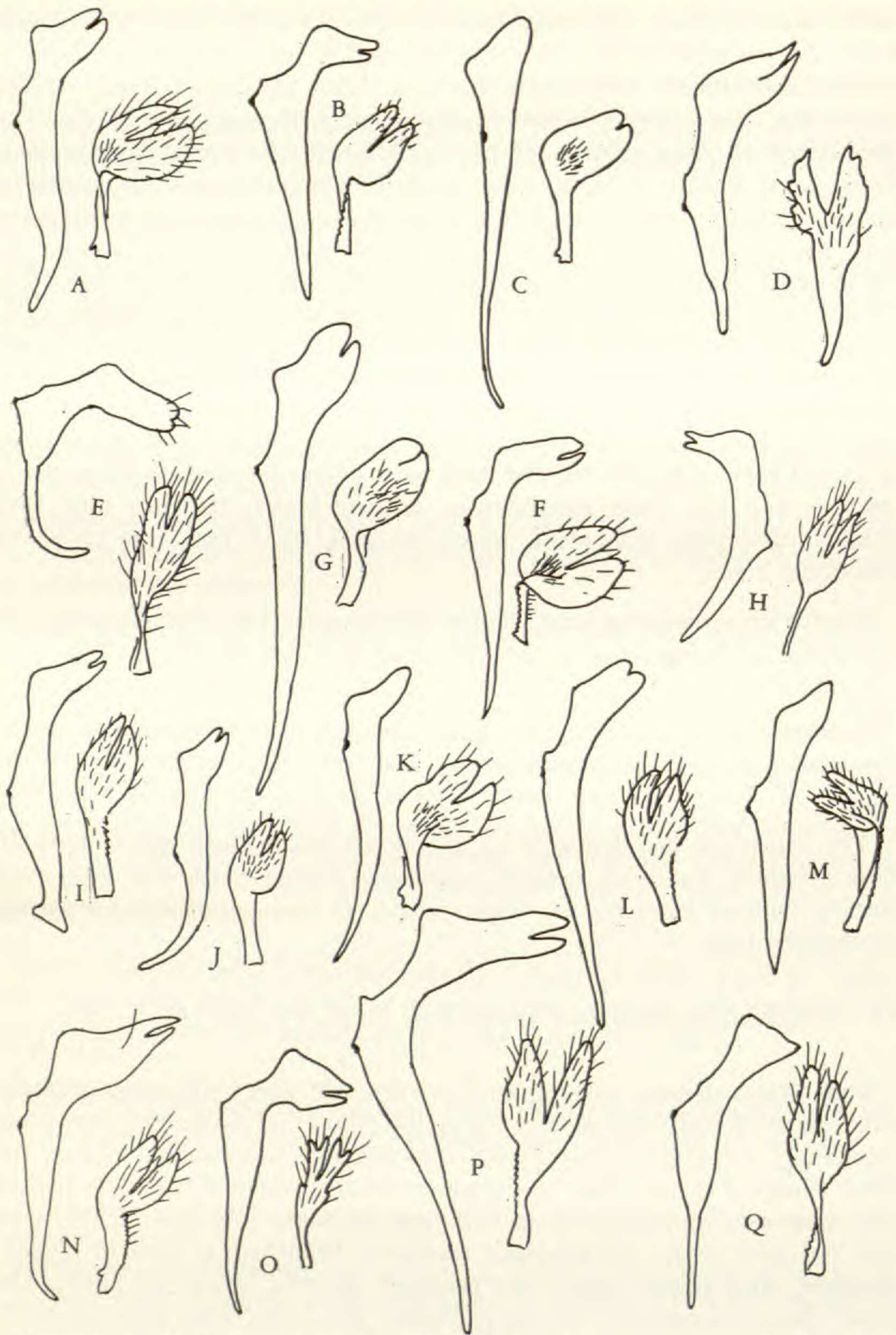


FIGURE 3. *Delphinium*, GROUP IV. Petals, the upper spurred, the lower clawed. A. *D. albiflorum*; upper lamina 9 mm. long, spur 5 mm.; lower lamina 6 mm. long, claw 5 mm.; drawn from *Davis* 30593 (BM). B. *D. aquilegifolium*; upper lamina 8 mm. long, spur 12 mm.; lower lamina 4 mm. long, claw 4 mm.; drawn from *Kotschy* 239 (A). C. *D. batalinii*; upper lamina 7 mm. long, spur 17 mm.; lower lamina 6 mm. long, claw 5 mm.; drawn from *Lipsky* 1685 (BM). D. *D. biternatum*; upper lamina 11 mm. long, spur 11 mm.; lower lamina 6 mm.



long, slightly oblique, entire at the roundish apex, the spur 17 mm. long; lower petals short-bifid near the apex, sparsely pilose, blue or whitish, the blade strongly oblique, oblong, 6 mm. long, the claw 5 mm.; stamens ca. 6 mm. long, somewhat dilated at the base, glabrous, the round-oblong anthers bluish, 1 mm. long; carpels 3, short-hirsute, 9–10 mm. long.

TYPE: Huth cited four specimens, all in the Turkestan Herbarium in Leningrad. The one sent me on loan from Leningrad was "*Trajectus montium Gasi Mailik, supra Choschbalak*," 6000 feet, *Regel* in 1883 (LE). I therefore choose this as lectotype.

DISTRIBUTION. At about 2000–3000 m., Turkestan or Asia Media.

REPRESENTATIVE SPECIMENS. *Lipsky* 1685; *Lipschitz* 685; *Regel* at Chosch Rawat.

14. *Delphinium biternatum* Huth, Bot. Jahrb. 20: 422. 1895.

FIG. 3, D.

*Delphinium floribundum* Freyn & Sint. ex Freyn, Bull. Herb. Boiss. II. 3: 561.

1903. Based on *Sintenis* 850, Aschabad, Suluklii (seen at BM, E, MO, P).

Stems glabrous below, more or less strigulose above, branched at middle or above, 4–12 dm. tall; basal leaves gone by anthesis; cauline leaves subglabrous, short petioled, the petioles dilated at the base, the blades ternate with petiolulate segments cuneate at the base and divided into 3 subsessile, lanceolate, entire or lobed parts, mucronate, 2–5 mm. wide, the leaf laminae 4–10 cm. broad; terminal raceme to 30 cm. long, the lateral shorter, ascending; lowest bracts leafy, trifid, to ca. 1.5 cm. long, the upper entire, to 12 mm. long; pedicels densely glandular-pubescent, shorter than the flower, the lance-linear bractlets near the base of the flower, 2–3

long, claw 6.5 mm.; drawn from *Rechinger* 1416 (US). E. *D. bucharicum*; upper lamina 9 mm. long, spur 10 mm.; lower lamina 6 mm. long, claw 5 mm.; drawn from type (LE). F. *D. carduchorum*; upper lamina 7 mm. long, spur 11 mm.; lower lamina 5.5 mm. long, claw 4 mm.; drawn from *Davis* 23954 (BM). G. *D. centeteroides*; upper lamina 9.5 mm. long, spur 20 mm.; lower lamina 7 mm. long, claw 4 mm.; drawn from *Griffith* 45 (GH). H. *D. chodatii*; upper lamina 8 mm. long, spur 8 mm.; lower lamina 6 mm. long, claw 4 mm.; from drawings in original description. I. *D. cyphoplectrum*; upper lamina 9 mm. long, spur 10 mm.; lower lamina 6 mm. long, claw 5 mm.; drawn from *Kotschy* 153 (MO). J. *D. dasystachyum*; upper lamina 8 mm. long, spur 9 mm.; lower lamina 4 mm. long, claw 4.5 mm.; drawn from *Balansa* 859 (GH). K. *D. dolichostachyum*; upper lamina 7 mm. long, spur 11 mm.; lower lamina 5 mm. long, claw 4 mm.; drawn from *Davis* 24566 (BM). L. *D. fissum* subsp. *anatolicum*; upper lamina 7 mm. long, spur 22 mm.; lower lamina 4.5 mm. long, claw 4.5 mm.; drawn from *Sintenis* 589 (US). M. *D. gorganicum*; upper lamina 9 mm. long, spur 10 mm.; lower lamina 4.5 mm. long, claw 6 mm.; drawn from *Rechinger* 6191 (US). N. *D. griseum*; upper lamina 10 mm. long, spur 10 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from type (w). O. *D. inopinatum*; upper lamina 8 mm. long, spur 12 mm.; lower lamina 5 mm. long, claw 3 mm.; drawn from TYPE (LE). P. *D. ithaburense*; upper lamina 10 mm. long, spur 18 mm.; lower lamina 6 mm. long, claw 6 mm.; *Douglas* 39 (US). Q. *D. karategini*; upper lamina 8 mm. long, spur 10 mm.; lower lamina 7 mm. long, claw 6 mm.; drawn from TYPE (LE).



mm. long; sepals ochroleucous, strigulose, the upper 11–12 mm. long, ovate, subacute, the spur pointed, 13–15 mm. long; lateral sepals more or less oblong, strigulose on midrib and finely puberulent at apex; lower sepals elliptic-ovate, strigulose especially in upper parts; upper petals with lamina ca. 11 mm. long and with 2 lobes 2.5 mm. long, the spur 11 mm. long; lower petals ca. 12 mm. long, including a very short spur (1.5 mm. long), bearded, bilobed for ca. 4 mm.; stamens 4–6 mm. long, glabrous, dilated at base; anthers yellow, 0.7 mm. long; follicles 3, hirsute, 10 mm. by 2.5 mm., the style an additional 2 mm.; seeds obpyramidal, 1.2 mm. long, densely clothed with transverse rows of scales.

TYPE: (lectotype) in montibus Kuh-i-Frusch, Turkestan, 7000 ft., June, 1883, *Regel* (LE); seen.

DISTRIBUTION. At about 1700–2500 m., Turkestan, Transcaspia, Khorasan (Iran).

ILLUSTRATION. NEVSKI in Komarov, Fl. U.S.S.R. 7: *pl.* 11, *fig.* 2*a*, 2*b*. 1937.

REPRESENTATIVE COLLECTIONS. Transcaspia: *Sintenis* 500. Turkestan: *Socalski* 292; *Popov* 259; *Mikelson* 2279; *Chaffanjon* 804; *Komarov*, June 26, 1893. Iran: Khorasan, *Rechinger* 1416.

15. *Delphinium bucharicum* M. Popow in Korowin, Kultiasow & Popow, Descr. Pl. Nov. Turkestan. 49. 1916. FIG. 3, E.

Stem 3–4 dm. high, straight, very slender, sulcate, short-pubescent below, naked above; leaves 2–3 at base of plant, the petioles 4–5 cm. long, vaginate; lamina 3-lobed, the lobes sessile, many times dissected into long narrow, somewhat pubescent laciniae less than 1 mm. wide; racemes simple, with about 8 crowded flowers; bracts membranaceous on margins, linear-lanceolate, ca. 4 mm. long; pedicels 4–7 mm. long, glabrous; bracteoles small, below the middle of the pedicel; flowers pale, whitish-blue; sepals glabrous, with dark blue veins, elliptic-oblong, 7–8 mm. long, the spur 8–9 mm. long, curved upward and with a small hump near the tip; petals scarcely lobed at apex, bluish white, the upper laminae perpendicular to the spur, ca. 9 mm. long, with a few bristles near the tip, the spurs 10 mm. long; lower petals bearded throughout, the laminae 6 mm. long, oblong, bilobed 1/3 their length, the claw 6 mm. long; follicles 3, glabrous.

TYPE: In the Tashkent Herbarium. A specimen loaned me from Leningrad as type material was *Kultiasow* 626, April 29, 1914 (LE).

DISTRIBUTION. Endemic on mountain slopes, middle Asia; described from mountains west of Bishkent.

Popov in a corrected supplement to his work, reduced his species to *D. leiocarpum* Huth, but Nevski in Komarov, Fl. U.S.S.R. 7: 170. 1937, maintains it. It has the hairiest lower petals that I have seen.

16. *Delphinium carduchorum* Chowdhuri & Davis, Notes Bot. Gard. Edinb. 22: 407. 1958. FIG. 3, F.

Stem 2.5–6 dm. tall, erect, acutely angled and subsulcate below,



branched, leafy above, strigulose to subglabrous below, spreading glandular-pubescent above; lower petioles 4–8 cm. long, more or less vaginate, the blades orbicular, 3–6 cm. in diameter, palmately trisect into glabrous lacinate segments 2–4 (–5) mm. wide, linear-lanceolate to linear or oblong-lanceolate; upper cauline leaves short petioled, trisect, the linear segments entire or divided almost to the base; raceme terminal, 7- to 20-flowered, lax or somewhat dense, 8–15 cm. long, glandular-pubescent; lower bracts 2.5–5 cm. long, mostly deeply tripartite, strigose, equaling or surpassing pedicels; upper bracts entire, lance-linear, ciliate, shorter than flowers; pedicels 8–15, or the lower to 30 mm., strict; bracteoles in upper part of pedicel, 5–8 mm. long; sepals intense blue or somewhat violet, oblong-ovate or elliptic-obovate, acute or obtuse, 9–13 mm. by 5–7.5 mm., somewhat strigose; spur 11–16.5 mm. long, attenuate, horizontal or somewhat curved; petals included, the upper falcate, the lamina 7 mm., short-bifid, the spur 11 mm. long; lower 7.5–10 mm. long, the ovate limb 4–6 mm. by 3–3.5 mm., acutely lobed to about the middle, bearded; filaments glabrous; follicles 3, oblong, pubescent, 7 mm. by 3 mm.; seeds triquetrous, squamate.

TYPE: Turkey, prov. Hakkari, Cilo Dag above Diz deresi, 2400 m., *Davis 23954* holotype (E), isotypes (BM, K); seen.

DISTRIBUTION. Rocky places, 2250 to 2850 m., Turkish Kurdistan and adjacent Iran.

REPRESENTATIVE COLLECTIONS. Turkey: *Davis 24370, 23349, 23325, 22593, 22801, 23061, 22734.*

Related to *D. micranthum* of Iraq, which has a more paniced strigose inflorescence.

17. *Delphinium centeteroides* (Brühl) Munz, comb. nov. FIG. 3, G.

*Delphinium saniculifolium* Boiss. subsp. *centeteroides* Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 95. 1896.

Stem ca. 3–9 dm. high, openly and rather freely branched, sparsely pubescent above, the hairs short, thickened at base, apparently glandular; leaves mostly withered by anthesis, the lower long petioled (to 12 cm. and with long dilated base), the upper shorter, remote; lower laminae apparently with few broad cuneate lobes, the uppermost trisect, 2–5 cm. long, the ultimate divisions linear; inflorescence an open panicle of short, rather few flowered, compact racemes; bracts simple, lance-linear, 4–5 mm. long; pedicels ascending, pubescent, mostly 1–2 cm. long; bracteoles lanceolate, ca. 3 mm. long, near the middle of the pedicel; sepals blue, strigulose; upper sepal ovate, ca. 10 mm. by 4 mm., pointed; spur 16–20 mm. long, slender, subcylindric, more or less curved; lateral sepals broadly oblong-elliptic, 10 mm. by 4 mm., rounded at tip, strigose on mid-line; lower sepals asymmetrically oblong-obovate, 10 mm. by 4.5 mm.; upper petals with oblique glabrous lamina 9–10 mm. long, unequally shallowly bilobed; spur to 20 mm. long; lower petals with a claw ca. 4.5 mm. long,



the oblong-ovate, bearded blade 7 mm. long, shallowly 2-lobed; stamens 6–7 mm. long, glabrous; anthers 1 mm. long; follicles hairy; styles 2.5 mm. long; seeds with short appressed scales.

TYPE: Afghanistan, *Griffith no. 45*, Herb. East India Co.; isotypes seen (GH, K).

DISTRIBUTION. At about 2200 to 3300 m., Afghanistan and West Pakistan (Baluchistan).

ILLUSTRATION of parts of flower, BRÜHL & KING, Ann. Bot. Gard. Calc. 5: *pl. 117, fig. 4g, 5h, 6e*.

REPRESENTATIVE SPECIMENS: Afghanistan: *Hay 373*. W. Pakistan: *Helen Crookshank 324, 366; Lace 3862; Jafri & Akbar 2197; Nasir 28459*.

This proposed species is of slender, strigulose, and pale-flowered plants.

18. *Delphinium chodatii* Oppenheimer, Bull. Soc. Bot. Genève II. 26: 94. 1936. FIG. 3, H.

Slender-stemmed, ca. 2.5 dm. tall, the stem sulcate, glabrous throughout; lower leaves 3–4, sparsely hirsute, the others glabrous, palmatifid, the segments divided into narrowly linear lobes, the blades ca. 2 cm. long; petiole somewhat dilated at the base, the lower longer than the upper; raceme leafless, rather lax, ca. 10-flowered; bracts lance-ovate, shorter than the pedicels; pedicels terete, recurved in flower, erect in fruit, thickened at summit; bracteoles basal, linear; sepals 9–10 mm. long, glabrous, pale rose; spur subattenuate, 9–12 mm. long; upper petals falcate, strongly oblique, the lamina ca. 8 mm. long, 2-toothed at apex, the spur 8 mm. long; lower petals obovate, the lamina densely bearded, divided  $\frac{2}{3}$  its length and ca. 6 mm. long, the claw 6–7 mm.; stamens glabrous; follicles 3, hairy; seeds obovoid-triquetrous, brown, winged.

TYPE: Ouadi Kelt, Palestine, "entre le Moulin et l'embouchure de la vallée de Jéricho," April 21, 1934, apparently at (G). Not seen.

ILLUSTRATION. Bull. Soc. Bot. Genève II. 26: 94. *fig. 1, 2*. 1936.

No specimens seen. Drawings copied from those in original description. The glabrousness of the plants and the pale rose flowers seem distinctive.

19. *Delphinium cyphoplectrum* Boiss. Diagn. I. 6: 7. 1845.

FIG. 3, I.

*Delphinium cyphoplectrum* var. *micranthum* Boiss. Fl. Orient. 1: 91. 1867.

*Delphinium schroedingerianum* Hand.-Mazz. Ann. K. K. Nat. Hofmus. Wien 27: 44. 1913. Based on *Kotschy 393a* and 400, near Persepolis. The latter seen (K).

Stem terete, branched above, 3–10 dm. tall, subglabrous to somewhat strigulose below, more loosely appressed-pubescent above; cauline leaves few, remote, with petioles to ca. 1 dm. long and somewhat vaginate at the base, the lower leaves palmately parted, then divided into oblong lobes 3–5 mm. or more wide, the laminae 5–8 cm. wide; racemes several, lax,



several flowered; bracts mostly entire, the lower to 2 cm. long, 1.5–3 mm. wide, the upper much reduced; pedicels densely appressed-puberulent, 5–10 mm. long, the 2 bracteoles near the base of the pedicel, 2–3 mm. long; sepals blue to smoky gray, the upper 12 mm. by 7 mm., obtuse, strigose, the spur straight, obtuse, subcylindric, 10 mm. long, ca. 3 mm. wide at the base; lateral sepals subelliptic, ca. 12 mm. by 4.5 mm., rounded at apex, somewhat strigose near end of midrib; lower sepals elliptic-obovate, broadly obtuse, ca. 13 mm. by 5 mm.; upper petals blue, the lamina obliquely truncate, 9 mm. long, bilobulate; lower 10–11 mm. long, the claw 4.5 mm., the limb ca. 6 mm., elliptic, bearded, the 2 parallel lobes 2.5 mm. long; stamens 8–9 mm. long, glabrous, slightly dilated in lower half; anthers 0.8 mm. long; follicles 3, pubescent.

TYPE: Mt. "Kuh-Malo prope Dalechi Persiae australis," March, 1842, *Kotschy 153*, presumably (G); isotypes seen (A, BM, K, MO, P).

DISTRIBUTION. Between 2000 and 2700 m., southern Iran.

EXAMPLES. *Haussknecht*, April, 1868; *Furse 3061*; *Loftus*, May 3, 1852; *Horner 153*; *Kotschy 400*.

20. *Delphinium dasystachyum* Boiss. & Bal. in Boiss. Diagn. II. 6: 7. 1859. FIG. 3, J.

*Delphinium dasystachyum* var. *ochroleucum* Boiss. Fl. Orient. 1: 88. 1867.

Based on Mt. Berit Da, *Hausskn.*, cited by Davis, Fl. Turkey 1: 113. 1965, as example of *D. dasystachyum*.

Plant cinerascens-strigulose throughout, the stem simple, more or less angled, 2–4.5 dm. tall, leafy to the inflorescence; lowest leaves 2–3 cm. broad, with petioles twice as long and vaginate at base, the laminae multifid into ultimate linear lobes ca. 1 mm. wide; upper cauline leaves more crowded, with short broad membranous petioles; inflorescence dense, many flowered, to ca. 1 dm. long; bracts 3–5-fid to the broad short petiole, strigulose, 1–2 cm. long; pedicels arcuate, 5–10 mm. long, the lanceolate acuminate bracteoles ca. 5 mm. long, 2 mm. wide, just beneath the flower; sepals broad based, bluish to dirty white, densely and loosely strigulose; upper sepal 8 mm. by 3 mm., obtuse, lance-ovate, the spur 10 mm. by 3 mm., acute, descending, slightly curved; lateral sepals 8 mm. by 3 mm., oblong, obtuse; lower sepals ca. 9 mm. by 3 mm., obtuse; upper petals glabrous, bluish to yellowish, oblique, ca. 8 mm. long, bidentate, the spur the same length; lower petals with claw 4–5 mm. long, lamina oblong-ovate, bearded, 4–5 mm. long, with terminal lobes ca. 2 mm. long; stamens yellow, 4–5 mm. long, glabrous, anthers 0.7 mm. long; follicles 3, ca. 6 mm. long, hairy, rugulose toward apex; seeds truncate, with transverse undulating rows of white lamellae.

TYPE: Summit of Ali-Dagh, at 1700 m., 7 km. se. of Caesarea, Cappadocia, Turkey, *Balansa 859* (probably G); isotypes seen (BM, GH, K, P).

DISTRIBUTION. Rocky slopes, 1500–2500 m., eastern Turkey.

EXAMPLES. *Davis 31669, 31999*; *Balls & Gourlay 1992, 1977*; *Furse 3732*.



21. *Delphinium dolichostachyum* Chowdhuri & Davis, Notes Bot. Gard. Edinb. 22: 408. 1958. FIG. 3, K.

Plant 5–8.5 dm. tall, the stem erect, acutely angled, subsulcate, branched above the middle, strigulose above, subglabrous below; lower and median cauline leaves palmately 3–5-sect, 5–8 cm. broad, subglabrous, long petioled, the segments 3–5-parted into lance-linear or lanceolate ultimate parts 2–5 mm. wide; petioles subvaginate at the base; upper leaves few, trisect; terminal raceme 13–23 cm. long, dense, many flowered, longer than the lateral ones; bracts prominent, the lower 1–3 bracts foliaceous, plurisect, longer than the pedicels, the middle tripartite into linear segments, the upper entire, linear-subulate; pedicels 9–25 mm. long, ascending-erect; bracteoles linear-subulate, on upper part of pedicel; sepals pale blue, 6–9 mm. by 3–4 mm., oblong-obovate or elliptic-ovate, obtuse or rounded at tip, densely strigulose, the spur 9–12 mm. long, slender, attenuate, acute, usually curved; petals included, the upper glabrous, with a short-bifid almost straight lamina 7 mm. long, spur 10 mm. long; lower petals with broad-ovate limb 4–5 mm. long and broad, bearded, bifid above the middle, the claw puberulent; stamens 5–6 mm. long; anthers yellowish, rounded, almost 1 mm. long; follicles 3, mostly 7–9 mm. by 3–4 mm., hirsute-pubescent; seeds 1.5 mm. long, scaly, triquetrous.

TYPE: Turkish Kurdistan, prov. Bitlis, Karz Dag above Kamer, 2200 m., *Davis 24566* (*Davis & Polunin 8–24–1954*); holotype (E); isotypes (BM, K); seen.

A specimen collected by *Are Rowi 12213* and one by *Gillett 11782* from Iraq (K) seem to belong here.

The species resembles *D. dasystachyum* in its small pale flowers, but differs in its tall branching, strigosity, less vaginate petioles, and tripartite (not multi-) lower bracts.

22. *Delphinium fissum* Waldst. & Kit. subsp. *anatolicum* Chowdhuri & Davis, Notes Bot. Gard. Edinb. 22: 404. 1958. FIG. 3, L.

*Delphinium leiocarpum* Huth, Bull. Herb. Boiss. 1: 334. 1893, as to type: *Sintenis 589*, Kaz Da, near Kareikos, Turkey; isotype seen (K). Same as *anatolicum*.

*Delphinium amani* Post ex Huth, Bull. Herb. Boiss. 3: 152. 1895. Based on *Shepard (Barbey 295)*, in 1892, Gaiour Da (Amanus); isotype seen (K).

Stem 5–9 dm. tall, 3–6 mm. thick, sometimes with vertical lines of short spreading hairs above; leaves few, the lower glabrous, with petioles very slightly dilated at the base, to 1 dm. long, the blades 7–18 cm. wide, palmately multifid into ultimate lance-linear to oblong segments 2–8 mm. wide; upper leaves reduced; raceme dense, 5–10 or more cm. long, many flowered, subglabrous; bracts simple, linear, 5–8 mm. long; pedicels recurved and subclavate at summit, mostly less than 1 cm. long; bracteoles near middle of pedicel, linear, 2–3 mm. long; sepals pale blue, glabrous; upper sepal ovate, 8 mm. long, 4 mm. wide, obtuse, the spur often sub-



vertical, straight, ca. 15 mm. long; lateral sepals oblong, obtuse, ca. 6 mm. by 2 mm.; the lower pair oblong-ovate, 6 mm. by 3 mm.; upper petals glabrous, pale, 7.5 mm. long, bilobulate, the spurs ca. 15 mm. long; lower petals with lamina ca. 4.5 mm. long, white bearded, the lobes 3.5 mm. long; stamens 5–6 mm. long, filaments dilated below, glabrous; anthers yellow, 0.8 mm. long; follicles 3, glabrous.

TYPE: Mt. Ida, near Kareikos, prov. Cannakale, Turkey, *Sintenis* 589, holotype (K), isotypes (BM, P, US); all seen.

DISTRIBUTION. Coniferous forest, 1000–1650 m., Anatolia. Subsp. *fissum* is European.

EXAMPLES. Anatolia: *Manissadjian* 675; *Davis* 13140, 14703; *Haradjian* 571, 552, 2537.

23. *Delphinium gorganicum* Rech. f. Ang. Österr, Akad. Wiss. Math.-Nat. 88: 226. 1951. FIG. 3, M.

Stem erect, 1–1.3 m. high, subsimple or with few branches above, somewhat fistulose, scattered-leafy, pale green, striate, glabrous or sparsely strigulose, especially above; lower leaves gone by anthesis, the petioles apparently long, the upper much shorter, subglabrous, slightly dilated at the base; leaf blades angled-cordate in outline, to ca. 1 dm. broad, 2–3-palmatisect into petiolulate segments that are long-cuneate at the base, obovate above and divided into 5–7 lance-linear lobes 5–8 mm. wide, 2–4 cm. long, subglabrous, paler beneath than above, acute, submucronulate; uppermost leaves simpler, passing into leafy divided bracts 3–5 cm. long, upper bracts strigose, trifid to lance-linear, 5–10 mm. long; terminal raceme lax, many flowered, to 3 dm. long; pedicels suberect, 1–10 mm. long, with yellow glandular pubescence; bracteoles 2, subulate, near the base of the pedicels; sepals yellow, puberulent, the upper sepal broadly ovate, 10 mm. by 8 mm., acutish, the spur 9–12 mm. long, almost straight, ca. 3 mm. wide at base, narrowed rapidly to the narrow apex; lateral sepals elliptic-obovate, 12 mm. by 5 mm., obtuse; lower sepals 12 mm. by 7 mm., obovate, obtuse; petals yellowish, the lamina of the upper slightly oblique, entire at the obtuse tip, ca. 9 mm. long, the spur 10 mm. long; lower laminae bearded, ciliate, oblong, 4.5 mm. by 3 mm., deeply cleft, the lobes lance-oblong, claw 6 mm. long, serrulate on upper edge; stamens almost 8 mm. long, somewhat ciliate, moderately widened; anthers light in color, round-oblong, 0.8 mm. long; follicles 3, pubescent.

TYPE: Iran: prov. Gorgan (Asterabad), Mt. Shawar near Hadjilang, 2400–2600 m., *K. H. & F. Rechinger* 6191 (w); isotypes seen (K, UC, US).

Very near *D. biternatum*; doubtfully distinct. No other collections seen.

24. *Delphinium griseum* Gilli, Repert. Sp. Nov. 57: 96. 1955.

FIG. 3, N.

Stem clothed at base with brownish black sheaths formed by old petiole bases, erect, angular-striate, subflexuous to bases of petioles, 6–7 dm. tall,



with few short branches in upper part and with short retrorsely appressed pubescence; lower petioles to 13 cm. long, dilated into a sheathing base, short-puberulent; upper shorter; blades roundish in outline, the lower 5–8 cm. broad, 3-parted almost to base, the parts cuneate, 2–3 cm. wide, 3–4 cm. long, their upper part divided into lobes 1–1.5 cm. long, 3–15 mm. wide; bracts linear, strigulose, ca. 3 mm. long; terminal raceme lax, 2–3 dm. long, ca. 20-flowered, the lateral racemes 12–15 cm. long, 10-flowered; pedicels ca. 1 cm. long, elongating in fruit, bibracteolate, closely and finely strigulose; sepals gray-violet, oblong, attenuate at base, obtuse, 9 mm. long, 2 mm. wide, appressed-puberulent on whole outer face, the upper sepal with a slightly curved obtuse spur 1 cm. long, puberulent, somewhat gibbous above the base; petals whitish, the upper glabrous or nearly so, the blade and spur each 10 mm. long, the former with 2 lanceolate lobules; lower petals lanceolate-spatulate, long stipitate, deeply lobed into acutish lobes with long hair on both sides, blade and claw each about 5 mm. long; filaments gray violet, dilated at base, sparsely short-hairy; anthers dark brown; follicles 3, slightly pilose toward the tips to almost glabrous; immature seeds trigonous, squamate or rugulose.

TYPE: In Kabul Gorge, southeast of Surobi, east Afghanistan, at 1050 m., May 28, 1951, *Gilli 839* (w); seen.

Another collection from "Sarobi," May 12, 1951, *O. H. Volk 1873* (w).

This species is very near *Delphinium kohatense* of the northwestern Himalaya, but apparently has more flowers in a raceme and they are larger. I am greatly indebted to Professor Rechinger and Dr. Riedl of the Natural History Museum of Vienna for the loan of the two specimens cited above.

25. *Delphinium ilgazense* Davis, Notes Bot. Gard. Edinb. 26: 169. 1965.

Stems 1.5–2 dm. tall, simple, terete, striate, sparsely strigulose below, with spreading glandular hairs in inflorescence; lower leaves long petioled, suborbicular, 2–3 cm. wide, palmatisect, strigose, the segments divided into ultimate linear laciniae ca. 0.5 mm. wide; inflorescence dense, 2.5–5 cm. long, 4- to 7-flowered; bracts viscid-pilose, the lower trisect or all entire, linear; pedicels erect, 5–7 mm. long; bracteoles in upper part of pedicel, lance-linear, 2.5–4.5 mm. long; sepals dark violet-blue, divergent, ovate-oblong, spreading-pilose, 7–10.5 mm. long; spur 13–14 mm. long, gradually attenuate, acute, horizontal; upper petals slightly exserted, the lamina glabrous, short-bifid; lower petals with a broadly ovate, deflexed, deeply bifid lamina bearded above and equal to the claw; follicles strigose.

TYPE: Kastamonu, Turkey, north side of Ilgaz Dag, 2200 m., on rocky limestone slopes, Aug. 28, 1962, *Davis 38373* (E) which I have not seen. Known from the type collection only; illustrated as *plate 17*, with the original description.

Endemic; Davis considers it near *D. cyphoplectrum*.



26. *Delphinium inopinatum* Nevski in Komarov, Fl. U.S.S.R. 7: 73, 727. 1937. FIG. 3, O.

Stem 7.5–8.5 dm. tall, leafy, almost wholly yellow glandular-pubescent; petioles 5–10 cm. long, widely dilated at base, densely pubescent; laminae of leaves 4–8 cm. broad, ternately parted, the first segments short petiolulate, divided bi- to triterately into terminal narrowly linear (1.25–2.5 mm. wide), densely pubescent laciniae; inflorescence mostly branched, the central raceme rather dense, 2.5–3.5 dm. long, the axis sparsely glandular-pilose; bracts minute, 2.5 mm. long, linear, glabrous or ciliolate; pedicels mostly less than 1 cm. long, glabrous; bracteoles linear-subulate, inserted above the middle of the pedicels; sepals pale, sordid bluish-lilac, 8–9 mm. long, 3.5–4 mm. wide, oblong-obovate, obtuse, glabrous, white-membranous on margins; spur nearly or quite straight, spreading to erect, glabrous, 10–11 mm. long, 2–2.5 mm. wide; petals whitish, the upper laminae perpendicular to the spur, glabrous, ca. 8 mm. long, bidentate, the spur 12 mm. long; lower laminae slightly oblique, long-hairy and ciliate, more or less laciniolate, ca. 4 mm. long, the claw 4 mm. long; follicles 12–15 mm. long, 4 mm. wide, erect, glabrous; seeds pale, 2.5–3 mm. long, with transverse rows of scales.

TYPE: Asia Media, “in montibus Ak-Tau” (Kazakhskiy), May 19, 1932, *Russanov 119* (LE); seen. The type is the only specimen that I have seen.

This species differs from *D. bucharicum* in its indument of yellow glandular hairs.

27. *Delphinium ithaburense* Boiss. Diagn. I. 8: 9. 1849. FIG. 3, P.

*Delphinium sulcatum* Reichb. ex Hoffmannsegg, Verz. Pfl. Nachtr. 1: 132. 1824. *Nomen*.

*Delphinium salmoneum* Mouterdè, Fl. Djebel Druse 98. *pl. III*, no. 2. 1953.

No type cited, but in the illustration, the legend says “Tell Ahmar, 15 May, 1942.” I have seen no specimen, and cannot separate it as a species from the description alone.

Stem 3–10 dm. tall, angled, simple, subglabrous to somewhat glandular-pubescent; leaves palmately 5–7-parted into cuneate segments, in turn coarsely toothed or lobed, the upper leaves laciniolate into oblong-linear lobes ca. 2 mm. wide; petioles vaginate at base; raceme elongate, simple, rather many flowered, often rather dense at anthesis, lax in fruit; bracts lance-ovate, 5–10 mm. long, ciliate or glabrous; pedicels mostly 5–10 mm. long, the lance-ovate bractlets 2–3 mm. long and near the base of the pedicel; flowers bluish white to pink or yellowish green; sepals membranous margined; upper sepal lance-oblong, 9–10 mm. long, subglabrous except for the pubescent patch below the acutish tip, the spur straight, glabrous, horizontal, ca. 15 mm. long, 2.5 mm. wide at base; lateral sepals oblong, ca. 9 mm. by 3.5 mm., rounded at the apex, with broad base, slightly pubescent toward the tip of the midrib; lower sepals elliptic-



oblong, 9 mm. long, 4 mm. wide, slightly asymmetrical; upper petals glabrous, obliquely truncate, the lamina 10 mm. long, 2-lobulate for 1 mm., the spur 15–17 mm. long; blade of lower petals 6–7 mm. long, bearded, with 2 lance-oblong lobes 3–4 mm. long, claw 3–4 mm. long; stamens 5–7 mm. long, lower half white, oblong, upper half yellow, narrow; anthers yellow, scarcely 1 mm. long; follicles 3, erect, hirsute, 13–16 mm. long, 4–5 mm. wide, the beak 3–5 mm. long; seeds ca. 2 mm. long, with several rows of scales.

TYPE: Mt. Thabor, Galilee, Palestine, *Boissier* in 1846 (c) not seen; isotype (p) seen.

DISTRIBUTION. Wooded places at 100–2000 m., mountains of Syria, Lebanon, Israel and Jordan.

ILLUSTRATION. MOUTERDE, Fl. Djebel Druse *Pl. III*, no. 2. 1953.

EXAMPLES. Lebanon: *W. O. Douglas* 39. Jordan: *Dinsmore* 1864. Israel: *Davis* 4608a, 4894A, 4896, 4608; *F. Meyers* B4864; *Egger* 6–29–1906.

28. *Delphinium karategini* Korsh. Bull. Acad. St. Pétersb. sér. 5. 9: 402. 1898. FIG. 3, Q.

Stem 8–15 dm. tall, freely branched above, rather equably leafy, with scattered more or less retrorse short hairs; petioles vaginate at base, 5–12 cm. long, the blades to 15 cm. broad, parted into long-petiolulate segments, these in turn divided into petiolulate parts which are dissected into linear laciniae to 3 cm. long and 1.5–2 mm. wide, more or less pubescent; uppermost leaves reduced; inflorescence of several divergent strict branches 1.5–5 dm. long, each rather openly many flowered, the axis glabrous; lowest bracts trifid into linear segments, others linear-subulate, glabrous, 6–9 mm. long; pedicels erect-divaricate, to ca. 10 mm. long, glabrous, the bracteoles near or below the middle of the pedicel, lance-linear, ciliate, ca. 3 mm. long; sepals pale blue, somewhat strigose, membranous margined; upper sepal 10–11 mm. by 4–5 mm., acute, the spur spreading upcurved, 12 mm. long, 3 mm. wide at base, blunt; lateral sepals oblong-obovate, rounded at apex, ca. 9 mm. by 4 mm.; lower sepals ca. 10 mm. by 4 mm., acute; petals whitish, the upper laminae strongly oblique, 7 mm. by 3 mm., glabrous, entire, the spur 10–11 mm. long; lower laminae almost straight, oblong-ovate, 7 mm. by 3 mm., bifid over halfway into lance-oblong lobes, long-ciliate and bearded, the claw 6 mm. long; stamens 7 mm. long, glabrous, the anthers pale, oblong, 1 mm. long; follicles 3, glabrous.

TYPE: Turkestan: Karategia, “ad ostium fl. Muksi,” June 23, 1897, *Korshinsky* 80 (LE); seen.

29. *Delphinium kohatense* (P. Brühl) Munz, comb. nov. FIG. 4, A.

*Delphinium saniculifolium* Boiss. var. *kohatense* P. Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 95. 1896.

*Delphinium saniculifolium* Boiss. var. *gilgitense* P. Brühl in Brühl & King, loc.



*cit.* Based on *J. L. Stewart*, Sept. 23, 1885, at 13,000'; Gilgit Expedition s. of Hindu Kush (κ); seen.

Stem slender, terete, mostly few branched above, 2–5 dm. high, sparsely strigulose below, densely so in the inflorescence; lower leaves 2–4 cm. broad, subglabrous to somewhat strigulose, trifid to base into cuneate segments, of which the two lateral are deeply divided so as to make 5 subequal, pinnately few lobed or toothed parts, the ultimate divisions 1–3 mm. wide, mucronate; petioles 2–7 cm. long, slender, somewhat dilated at base; cauline leaves few, remote, reduced; racemes rather open, to ca. 10-flowered, slender, strigulose; bracts linear, 2–3 mm. long; pedicels ascending, 5–25 mm. long; bracteoles lanceolate, near the base of the pedicel; sepals pale blue, blunt, the upper 6–8 by 3 mm., strigulose, the spur cylindric, obtuse, 5–7 mm. long; lateral sepals 7.5–8 mm. by 2.5 mm.; lower sepals ca. 8 mm. by 3 mm., oblong-ob lanceolate; upper petals ca. 7.5 mm. long, pale, oblique, the bearded lamina with terminal lobes 1 mm. long; spur 5 mm. long; lower petals ca. 8 mm. long, lamina and spur subequal in length, the former bearded, divided for 2.5 mm.; stamens 4.5–5.5 mm. long, the filaments bluish, somewhat ciliate on expanded lower part; anther 0.8 mm. long; follicles 3, pubescent at tip.

LECTOTYPE: Pakistan: Kohat & Wagiristan, *Drummond* (CAL), seen; but specimen old and almost without flowers. I am greatly indebted to Mr. K. S. Srinivasan for loan of the above and other specimens from the Calcutta Herbarium. What is apparently the same thing, collected by *J. L. Stewart*, at dry places up to 3500', (κ) was seen.

ILLUSTRATION. BRÜHL & KING, *Ann. Bot. Gard. Calc.* 5: *pl.* 117, *fig.* 1 & 2. 1896.

DISTRIBUTION. Dry places, mostly below 3000 m., Afghanistan and West Pakistan to northwest India.

REPRESENTATIVE SPECIMENS. Afghanistan: *Herb. Griffith* 43. Punjab: *Aitchison* 1004; *Drummond* 14811; *R. R. Stewart* 10936. West Pakistan: Chitral, *Stainton* 2529; *Siddiqui & Arahman* 26865; *Toppin* 370; *Dr. Giles*, June 24, 1886.

30. *Delphinium kurdicum* Boiss. & Hohen. in Boiss. *Diagn.* I. 1: 67. 1842. FIG. 4, B.

*Delphinium kurdicum* var. *elongatum* Freyn & Sint. *Österr. Bot. Zeitschr.* 41: 363. 1891. Based on *Sintenis* 2822 from Mt. Sokardidagh, Armenia; not seen, but cited by Davis as example of *D. kurdicum* in *Fl. Turkey* 1: 116. 1965.

Stem somewhat zigzag, few branched, 3–5 dm. tall, more or less strigulose with very short hairs, many of which are enlarged at base; lower leaves withered by anthesis, upper multifid into few linear or lanceolate lobes 8–20 mm. wide, 3–8 cm. long; racemes in an open panicle, rather few to many flowered, more or less peduncled; bracts lance-linear, 5–10 mm., rarely to 30 mm. long; pedicels somewhat divaricate, 5–15 mm. long;



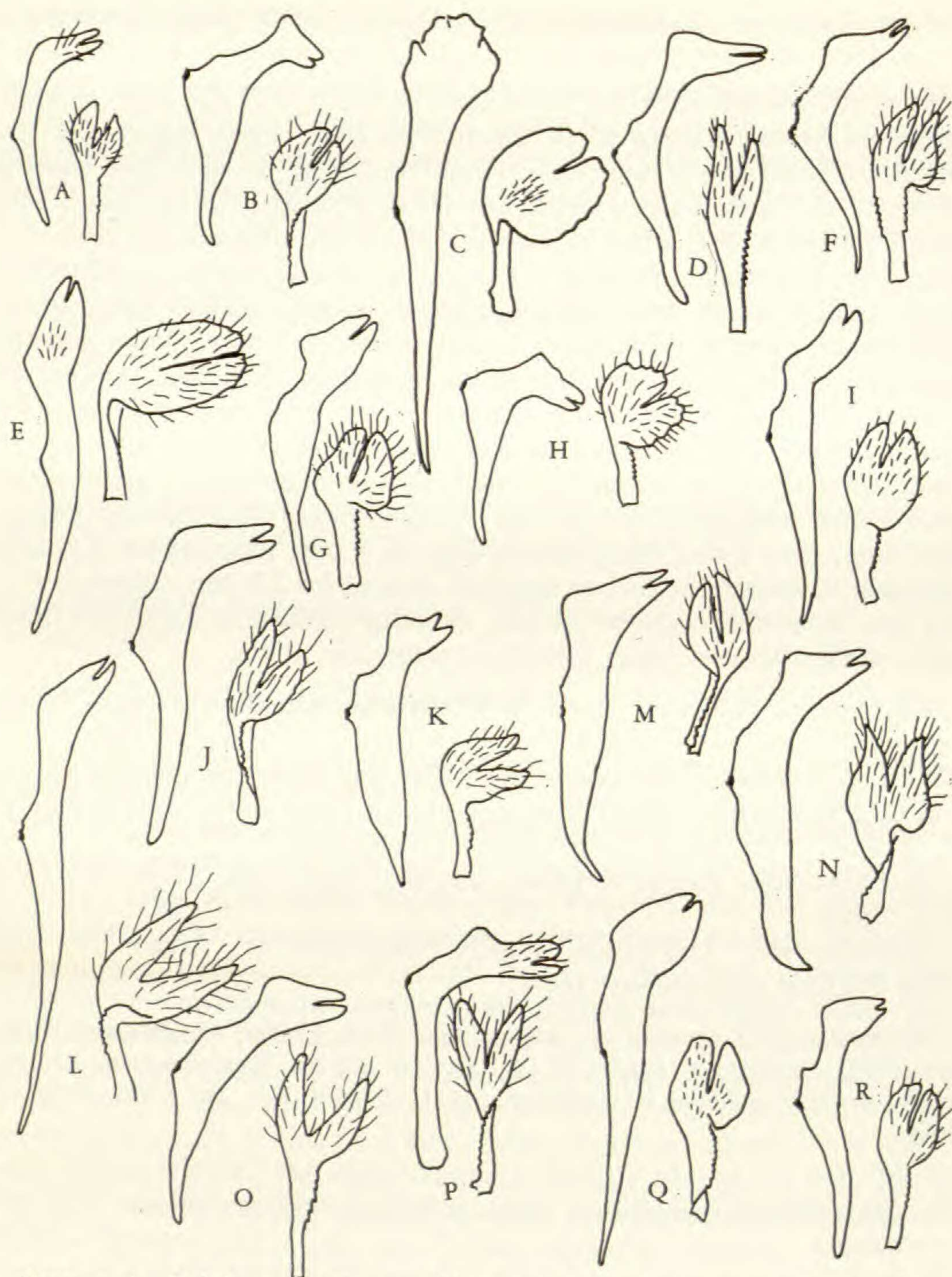


FIGURE 4. *Delphinium*, GROUP IV. Petals, the upper spurred, the lower clawed. A. *D. kohatense*; upper lamina 7.5 mm. long, spur 5 mm.; lower lamina 4 mm. long, claw 4.5 mm.; drawn from R. R. Stewart in 1936 (NY). B. *D. kurdicum*; upper lamina 7 mm. long, spur 10 mm.; lower lamina 4.5 mm. long, claw 4.5 mm.; drawn from Kotschy 427 (MO). C. *D. latesquamatum*; upper lamina 11 mm. long, spur 16 mm.; lower lamina 6 mm. long, claw 4 mm.; drawn from Gilli 840 (W). D. *D. laxiusculum*; upper lamina 8 mm. long, spur 10 mm.; lower lamina 5 mm. long, claw 4.5 mm.; drawn from Sjoqvist (GH). E. *D. longebracteatum*; upper lamina 12 mm. long, spur 10 mm.; lower lamina 8 mm. long, claw 5 mm.; drawn from Balansa 1353 (US). F. *D. longipedunculatum*; upper lamina 8 mm. long, spur 11 mm.; lower lamina 7 mm. long, claw 5 mm.; drawn from Mo. Bot. Gard. 1,720,217. G. *D. macropogon*; upper lamina 7 mm.



bracteoles 3–4 mm. long, situated above the middle of the pedicel; sepals yellowish to dirty white, strigulose to glabrous, the upper sepal ovate, 7.5–8 mm. long, 3.5 mm. wide, acute, the spur horizontal, 10–11 mm. long, 3.5 mm. wide at base; lateral sepals 8 mm. by 3 mm., oblong, broadly unguiculate, pubescent on median line or more broadly; lower sepals 8 mm. by 3 mm., rather pointed, broadly unguiculate; upper petals glabrous, obliquely truncate, yellowish, the limb 7 mm. long, bidentate, the spur 10 mm. long; lower petals with claw 4 mm., blade 4.5 mm. long, the latter broadly elliptical, bearded, lobed ca. 2 mm. deep; stamens 4–5 mm. long, glabrous; anthers 0.8 mm. long; follicles 3, glabrous, 8 mm. by 3.5 mm., the styles an additional 2 mm.

TYPE: "Ad fontes montis Gara Kurdistaniae," *Kotschy* 427 (originally published as 627) (G) not seen; isotypes (BM, K, MO, P) seen.

DISTRIBUTION. Dry slopes and plains, 1000–1400 m., northern Iraq and eastern Turkey.

EXAMPLES. **Turkey:** *Kotschy* 503; *Sintenis* 1185; *Davis* 31496. **Iraq:** *Ali al-Rawi & Serhang* 23807; *R. Wheeler Haines* 416.

31. *Delphinium latesquamatum* Gilli, Repert. Sp. Nov. 57: 94. 1955.

FIG. 4, C.

Stem 2.5–6 dm. high, clothed at base with whitish sheaths of old leaves, terete, striate, erect, subflexuous, with divaricate branches 2–4 dm. long, with short retrorse pubescence throughout, mixed with glandular hairs in the upper parts; petioles 1.5–3 cm. long in lower leaves; blades cuneate, 3-parted to the lower third, 2–8 mm. wide, the parts incised into ultimate laciniae 0.5–2 mm. wide; cauline leaves with petioles 0.3–3 cm. long, the ultimate divisions of the laminae 0.5 mm. wide, acute; bracts linear, puberulent, 3–10 mm. long; pedicels 1–2 cm. long, bibracteolate mostly

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long, spur 10 mm.; lower lamina 4.5 mm. long, claw 4 mm.; drawn from TYPE (LE). H. *D. macrostachyum*; upper lamina 6 mm. long, spur 9 mm.; lower lamina 5 mm. long, claw 3.5 mm.; drawn from *Sintenis* 1266 (PHIL). I. *D. micranthum*; upper lamina 7 mm. long, spur 12 mm.; lower lamina 6 mm. long, claw 4 mm.; drawn from *Gillett* 9501 (US). J. *D. nuristanicum*; upper lamina 10 mm. long, spur 12 mm.; lower lamina 5 mm. long, claw 6 mm.; drawn from *W. E. Brown* 804 (K). K. *D. ochroleucum*; upper lamina 7 mm. long, spur 8 mm.; lower lamina 5 mm. long, claw 4.5 mm.; drawn from *Hohenacker* at Schuscha (GH). L. *D. pallasii*; upper lamina 10 mm. long, spur 18 mm.; lower lamina 6.5 mm. long, claw 6 mm.; drawn from TYPE (LE). M. *D. pallidiflorum*; upper lamina 9 mm. long, spur 10 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Heideman* in 1932 (K). N. *D. penicillatum*; upper lamina 8 mm. long, spur 10 mm.; lower lamina 5 mm. long, claw 4 mm.; drawn from *Aucher* 4034 (K). O. *D. puniceum*; upper lamina 10 mm. long, spur 9 mm.; lower lamina 6 mm. long, claw 6 mm.; drawn from *Hohenacker* in 1834 (CAS). P. *D. quercetorum*; upper lamina 9 mm. long, spur 11.5 mm.; lower lamina 5 mm. long, claw 5.5 mm.; drawn from *Haussknecht* in Kurdistan (BM). Q. *D. roylei*; upper lamina 8 mm. long, spur 14 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Koelz* 9261 (GH). R. *D. saniculifolium*; upper lamina 7 mm. long, spur 9 mm.; lower lamina 5 mm. long, claw 4 mm.; drawn from *Rechinger* 3364 (US).



above the middle, the bracteoles 2–3 mm. long; sepals blue, obovate, obtuse or acutish, 6–9 mm. long, 4–6 mm. wide, puberulent and glandular without, the spur slightly curved, not gibbous, 13–17 mm. long; petals somewhat yellowish below, bluish toward the tips, the upper lamina 10–11 mm. long, glabrous, almost round near the tip, where 5 mm. in diameter, crenulate, the spur ca. 12–13 mm. long; lower laminae 6 mm. by 5 mm., glabrous save for the patch of hairs near the base, with 2 lobes 1–2 mm. long, claw 3–4 mm. long; filaments glabrous; anthers dark brown; follicles 3, pilose, to ca. 8 mm. long; seeds with many tiers of broad scales.

TYPE: Afghanistan, near Bamian, 2950 m., Aug. 29, 1951, *Gilli* 840 (w); seen.

REPRESENTATIVE COLLECTIONS. All from Afghanistan: prov. Orozgan, *Rechinger* 18812; *Lindberg* 875, 964; central Nuristan, *Kerstan* 1399, at 2600 m.; *Edelberg* 1208 at 2000 m.; prov. Ghazni, *Rechinger* 17552, 17629, at 3300 m.; prov. Bamian, *Rechinger* 18698, 18449, 18250.

The species seems near *D. batalinii* of Turkestan, but has much wider petals. I am very grateful to Dr. K. H. Rechinger and Dr. H. Riedl of the Natural History Museum at Vienna for the loan of the material cited above.

32. *Delphinium laxiusculum* (Boiss.) Rouy, Fl. France 1: 143. 1893.  
Nevski in Komarov, Fl. U.S.S.R. 7: 175. 1937. FIG. 4, D.

*Delphinium hybridum* Willd. var. *laxiusculum* Boiss. Fl. Orient. 1: 89. 1867.

*Delphinium hybridum* subsp. *laxiusculum* N. Busch in Fl. Cauc. Crit. III. 3: 56. 1903.

*Delphinium hybridum* var. *gracillimum* Ledeb. Fl. Rossica 1: 61. 1841. Placed here by Nevski in Komarov, Fl. U.S.S.R. 7: 175. 1937.

*Delphinium hybridum* var. *hirtula* Trautv. Acta Horti Petrop. I. 1: 21. 1878. Placed here by Nevski in Komarov, Fl. U.S.S.R. 7: 175. 1937.

*Delphinium cyphoplectrum* Boiss. var. *stenophyllum* Boiss. Fl. Orient. 1: 91. 1867. Isolectotype (Davis), Schambulagh, Iran, *Szowits* (κ), seen.

*Delphinium talyschense* Tzvelev, Not. Syst. ex Hort. Inst. Bot. Komarovii 19: 6. 1959. Type, Azerbaidzhan, Talysch, *Matveeva* 555 (LE), seen.

Stem 2–5.5 dm. tall, somewhat angled and sulcate, strigulose, quite densely so in the inflorescence, simple; lower leaves with petioles to 1 dm. long and vaginate at the base, blades 3–10 cm. wide; cauline leaves remote, the uppermost with shorter petioles, blades palmately 5-fid, the segments openly laciniate into few lobes 1–2 mm. wide; raceme 12–18-flowered, lax, strigose; bracts simple, lanceolate, 3–20 mm. long; pedicels mostly 5–15 mm. long; bracteoles 2, near base of pedicel, 2–3 mm. long; sepals blue, the upper strigulose, 12 mm. by 4 mm., lance-ovate, acute, the spur cylindrical, blunt, 12 mm. long, 2.5 mm. wide at the base; lateral sepals elliptical, 10 mm. by 4 mm., obtuse, strigose near the tip of midrib; lower sepals 12 mm. by 4 mm., acute, more generally strigose; upper petals bluish, oblique, ca. 8.5 mm. long, shallowly bilobulate, the spur 8.5–9 mm. long; lower petals bluish, claw 4.5 mm. long, blade 7.5 mm. long, bearded,



narrow, with 2 lanceolate lobes 3–4 mm. long; stamens 6–7 mm. long, glabrous, dilated in lower half; anthers bluish, 0.7 mm. long; follicles 3, strigose, 11–20 mm. long, the beak an additional 2–3 mm.

TYPE: "Hab. inter segetes prope Elisabethpol," *Hohenacker in 1834* (G) not seen, isotypes (GH, K, LE, MO) seen.

DISTRIBUTION. Transcaucasia, northern Turkey, and northern Iran.

EXAMPLES. Transcaucasia: *Gurvitsch* in 1937. Iran: *Furse & Synge* 784; *Pichler*, in 1882. This plant is treated in Davis, Fl. Turkey 1: 115. 1965, as *D. cyphoplectrum* var. *stenophyllum*.

33. *Delphinium longebracteatum* (Boiss.) Munz, comb. nov.

FIG. 4, E.

*Delphinium dasystachyum* Boiss. & Bal. var. *longebracteatum* Boiss. Fl. Orient. 1: 89. 1867.

*Delphinium szovitsianum* var. *longebracteatum* (Boiss.) Huth, Bot. Jahrb. 20: 438. 1895.

Stem simple, subterete, 2–3 dm. tall, substrigulose below, densely pubescent above with soft yellowish spreading hairs; lower leaves with petioles 4–7 cm. long, much dilated at base, middle cauline and upper petioles shorter, the broad base membranous, 1–1.5 cm. long, almost 1 cm. wide; blades 2–3 cm. wide, multifid into linear lobes to ca. 1 mm. wide; inflorescence dense, 4–8 cm. long, soft-hairy, many flowered; lower bracts to 3 cm. long, with long linear segments and dilated membranous base, the upper ca. 1 cm. long, simple, with dilated hairy base and long attenuate tip; pedicels to 1.5 cm. long, more or less curved; bracteoles to ca. 9 mm. long, membranous, with subulate tip and placed about the middle of the pedicel; flowers yellowish, the sepals with long yellow or white hairs, upper sepal 11 mm. by 5.5 mm., obtuse, the spur 12 mm. long, descending, acute; lateral sepals oblong-obovate, 10 mm. by 4.5 mm., rounded at apex; lower sepals elliptic-oblong, 10 mm. by 4.5 mm.; upper petals oblique, the blade 12 mm. long, somewhat bearded on inner face of lamina and with terminal lobules ca. 1 mm. long; lower petals unguiculate, the claw ca. 5 mm. long, the lamina bearded, oblong, 5 mm. long, the 2 parallel lobes ca. 3 mm. long; stamens glabrous, 5–6 mm. long; anthers 0.8 mm. long; follicles 3, hairy.

TYPE: Northeastern Turkey: "in monte Bingoldagh Armeniae alt. 6000'," *Kotschy* 754 (G). Not seen.

DISTRIBUTION. At 1500 to 2200 m., northeastern Turkey.

EXAMPLES. *Balansa* 1353; *Balls & Gourlay* 1977a.

So far as I can see these collections are referred to *D. dasystachyum* by Davis, Fl. Turkey 1: 113. 1965, but the more spreading pubescence of the upper stems, more yellowish sepals, longer upper petals, etc., seem to me to separate *Delphinium longebracteatum* from that species.



34. *Delphinium longipedunculatum* Regel & Schmalh. Acta Horti Petrop. 5: 226. 1877. FIG. 4, F.

Stem slender, 3–6 dm. high, zigzag, slightly angled, sparsely pilose below, glabrous above, subdivaricately branched above; leaves remote, largely withered by anthesis, the petioles dilated at the base, 2–5 cm. long, the blades rounded-cordate, palmately lobed, the lobes incised into broadly oblong, obtuse lobules; inflorescence open, subpaniculate, the flowers on each branch rather few; bracts entire, lance-linear, 3–5 mm. long; pedicels stiff, slender, 2–6 cm. long; bracteoles opposite, ca. 3 mm. long, placed well below the flower; sepals deep blue, glabrous; upper sepals lance-ovate, 9 mm. long, 4 mm. wide, acute, spur straight, subcylindric, blue, horizontal, acute, 11–13 mm. long; lateral sepals oblong-ovate, 9 mm. by 5 mm., abruptly narrowed into an acute tip; lower sepals elliptic-obovate, 9 mm. by 5.5 mm., rounded apically; upper petals white with bluish tinge, 8–9 mm. long, the terminal lobules slightly more than 1 mm. long; lower petals bluish, white bearded, the lamina 7–8 mm. long, with divaricate lobes 3 mm. long and the claw 4.5 mm. long; stamens 5–6 mm. long, bluish, dilated below, glabrous; anthers 1 mm. long; follicles 3, glabrous, 10–12 mm. long, 2 mm. thick.

TYPE: "In montibus Karatau inter Turkestan et Tschemkent," A. Regel, May, 1876 (LE) seen; possible isotypes seen (BM, K, P).

DISTRIBUTION. Turkestan.

EXAMPLE. *Vnorrili* 43.

35. *Delphinium macropogon* Prokhanov, Not. Syst. ex Herb. Komarovii 21: 417–437. 1961. FIG. 4, G.

Stem 2–10 (–14) dm. tall, 2–5 mm. thick, ridged, glabrous below, somewhat strigulose in inflorescence, more or less zigzag, remotely leafy, simple or few branched in inflorescence; lower leaves long petioled (14–25 cm.), cauline petioles to ca. 1 dm., somewhat vaginate; blades suborbicular, 7–15 cm. broad, pubescent on both surfaces, paler beneath, palmately 5–7-fid to base into obovate segments narrow-cuneate below, more or less trifid above into lance-linear lobes 13–30 mm. long, 2–7 mm. wide; racemes 5–12 cm. long, dense, many flowered; bracts linear, 5–15 mm. long, white margined, somewhat pubescent on margins; pedicels 5–8 mm. long, strigose; bracteoles linear, 3–6 mm. long, situated near middle of pedicel; sepals ochroleucous to whitish, pubescent; upper sepal 9 mm. by 5 mm., spur conic-cylindric, 10–12 mm. long; lateral sepals 7 mm. by 4 mm., elliptic, rounded at apex; lower sepals ca. 8 mm. by 4 mm.; petals white, the upper laminae strongly oblique, 7 mm. long, glabrous, bidentate, the spur 10 mm. long; lower laminae round-ovate, 4.5 mm. in diameter, bearded and ciliate in upper parts, bifid almost to base into approximate broad segments, claw 4 mm. long; stamens 6–7 mm. long, glabrous; anthers pale, elongate; follicles 8–10 mm. long, glabrous to strigose; seeds obovoid, to 2 mm. long.



TYPE: Daghestan: Kukurt-Tau, 2 km. from Mukku, *Prokhanov* 43, (LE) seen. No other material available.

36. *Delphinium macrostachyum* Boiss. ex Huth, Bot. Jahrb. 20: 441. 1895. FIG. 4, H.

Stem erect, flexuous, 6–15 dm. high, 3–4 mm. thick, glabrous below, sometimes puberulous above; leaves remote, long petioled, the petioles broadly vaginate at the base; lower leaf blades to 3 dm. across, subglabrous, multifid, the lobes broadly lanceolate; upper leaves 3–5-parted, the parts subentire; inflorescence simple and racemose or openly few branched, 3–5 dm. long, densely and many flowered; bracts entire, lance-subulate, 4–6 mm. long; pedicels 6–10 mm. long; bracteoles linear, 2–3 mm. long, near the middle of the pedicel; sepals deep violet to bronze-black, glabrous, the upper sepal ovate, 9 mm. by 4 mm., obtuse, the spur obtuse, straight, ca. 10 mm. long, 3 mm. wide at the base; lateral sepals 10–11 mm. long, 2.5 mm. wide, subobtuse; lower sepals 9 mm. by 4 mm., rounded at apex; upper petals violet, glabrous, ca. 7 mm. long, the 2 lobes 1 mm. long, the spur at right angles to the lamina and ca. 9 mm. long; lower petals violet, the claw 3 mm. long, the lamina roundish, white bearded, the lobes 3 mm. deep; stamens 5–6 mm. long, glabrous; anthers dark, 0.8 mm. long; follicles 3, erect, glabrous, 10 mm. long, the styles another 3 mm.

LECTOTYPE: Turkey: Bakakri near Mardin, July 2, 1888, *Sintenis* 1266 (K); isotypes (P, PHIL); all seen.

DISTRIBUTION. Kurdistan from Turkey to Iran; on rocky limestone slopes at 1200–2000 m.

SEEN. Iran: *Furse* 3404. Iraq: *Wheeler Haines* 513; *Rami, Hoshen & Nuri* 29481.

37. *Delphinium micranthum* Boiss. & Hohen. in Boiss. Diagn. I. 1: 68. 1842. FIG. 4, I.

Stem angled, subglabrous to strigulose, slender, 3–5 dm. tall; petioles dilated-vaginate at base, the lower to 8 cm. long, the upper shorter; leaves 3–5-parted, then multifid into linear lobes ca. 1 mm. wide; racemes in loose panicles, but only 5–7-flowered; bracts linear (the lower trifid), 5–15 mm. long; pedicels 5–20 mm. long, bibracteolate just below the flower or lower, the bracteoles linear, 4–5 mm. long; sepals purple-blue, 7–10 mm. long, strigulose; spur straight, acute, 10–15 mm. long; upper petals glabrous, bluish, the blade about 7 mm. long, the spur 10–12 mm.; lower petals with the limb ovate, bifid to the middle and almost 6 mm. long; stamens somewhat bluish, 5–6 mm. long; anthers 0.6 mm. long; follicles 3, glabrous or glandular-pubescent, 6–8 mm. long, the styles an additional 1.5–2 mm.

TYPE: Iraq: Mt. Gara, Kurdistan, *Kotschy* 610, in 1843 (G), not seen. I have seen *Kotschy* 410, July 1841 (P) from same region.



DISTRIBUTION. At elevations below 2800 m., Iraqui Kurdistan.

EXAMPLES. *J. B. Gillett* 9501, 11206, 12473; *Gillett & Rawi* 7404, 7223; *Guest & Ludlow-Hewitt* 2691; *Lazar* 118; *Al-Rawi* 24731; *Wheeler Haines* 1320; *Guest* 2916.

38. *Delphinium nuristanicum* Tamura, *Acta Phytotax. Geobot.* 16: 141. 1956. FIG. 4, J.

Stem 4–8 dm. tall, 3 or more mm. thick, simple or branched in inflorescence, sparsely white-hispidulous below, glabrous above the very base; radical and lower cauline leaves round-reniform in outline, 3–5 cm. long, 4–6 cm. wide, 3-parted almost to base, the lateral segments bipartite, all 5 parts incised-laciniate into lance-linear, obtuse lobes white-hispid on margins and lower surface; petioles 6–10 cm. long; upper cauline leaves glabrous, tripartite almost to base into linear-oblong segments 2–4 cm. long, 2.5–5 mm. wide, short petioled; raceme simple or branched below, 1–2 dm. long, few to many flowered; lower bracts to 18 mm. by 1.8 mm., petioled, the upper linear-filiform, 3–8 mm. long; pedicels 5–12 mm. long, more or less divaricate, elongating after anthesis, with some spreading, yellowish, glandular hairs near the summit; bracteoles near middle of pedicel, ca. 3 mm. long; sepals blue with pale median band, glabrous; upper sepals 12–13 mm. long, 4 mm. wide, obtuse, the spur horizontal with decurved tip, 12 mm. long, 2.5–3 mm. wide at base; lateral sepals 12 mm. by 4 mm., rounded at apex; lower sepals 10–12 mm. by 4–5 mm., oblong with rounded apex; upper petals whitish, the lamina strongly oblique, ca. 10 mm. long, glabrous, deeply bidentate, the spur ca. 12 mm. long; lower petals bluish, the oblong-obovate lamina ca. 6 mm. by 4 mm., bearded, cleft into 2 lanceolate divaricate lobes ca. 3 mm. long, the claw 6 mm. long; stamens 7–8 mm. long, glabrous, the roundish anthers 1 mm. long; carpels 3, said to be pilose in the type, glabrous in specimen cited below.

TYPE: Afghanistan: Nuristan: Chatras at 2100 m., *Kitamura*, Aug. 2, 1955 (KYO), not seen.

ILLUSTRATION. KITAMURA, *Fl. Afghan.* 126. fig. 50. 1960.

SPECIMEN SEEN. West Pakistan: Chitral, *W. E. Brown* 804 (K).

Resembling *D. penicillatum* of southern Iran, but that species is viscid-pubescent, has shorter bracts and pedicels, smaller sepals.

39. *Delphinium ochroleucum* Stev. ex. DC. *Syst.* 1: 353, 546. 1817. FIG. 4, K.

*Delphinium hybridum* var. *ochroleucum* Boiss. *Fl. Orient.* 1: 89. 1867, as to type.

*Delphinium hybridum* ssp. *ochroleucum* Busch in *Fl. Cauc. Crit.* III. 3: 54. 1903.

*Delphinium ochroleucum* var. *sulphureum* Regel ex Huth, *Bot. Jahrb.* 20: 432. 1895. Not typified.



Stem slender, mostly 3–7 dm. tall, sparingly strigulose below, almost glabrous in inflorescence; lower leaves mostly withered by anthesis, long petioled, the petioles broad and vaginate at base, cauline leaves crowded, short-petioled, largely 2–4 cm. in diameter, 3–5-parted, then again divided into many narrowly linear lobes 0.5–1.5 mm. broad, strigulose; raceme generally simple, dense, many flowered, mostly 1–2 dm. long; lower bracts trifid, upper entire, linear, 8–15 mm. long; pedicels shorter than flowers, bibracteolate in middle; sepals ochroleucous, glabrous, the upper one ca. 7 mm. long, ovate, acute, its spur erect, 10–11 mm. long, 2 mm. wide at base; lateral sepals 5.6 mm. by 2 mm., more or less oblong; lower sepals 7 mm. by 3 mm.; upper petals with bluish tinge, glabrous, 7 mm. long, bidentate, the spur 10 mm. long; lower petals with blade ca. 5 mm. long, the 2 bearded lobes ca. 3.5 mm., the claw serrulate; stamens 4–5 mm. long, glabrous; anthers yellow, 0.8 mm. long; follicles 3, erect, 12–15 mm. long, 3 mm. thick, glabrous, the style an additional 2.5–3 mm.

TYPE: "Hab. in Iberia," now East Georgia (G) not seen. I have, however, seen a photograph of the Leningrad specimen "Iberia, comm. Steven" (K).

DISTRIBUTION. Apparently largely below 1000 m., mountains of Caucasus and Transcaucasia.

EXAMPLES SEEN. *Kolenati* 1590; *Hohenacker* near Schuscha; *Grossheim* 37; *Woronow* 990; *Davis* 33907, 33853; *Capus* 50, 51, 53.

40. *Delphinium pallasii* Nevski in Komarov, Fl. U.S.S.R. 7: 177. 727. 1937. FIG. 4, L.

*Delphinium tauricum* Pallas, Ind. taur. in Neueste Nordische Beiträge 3: 432. 1796; *nomen*.

*Delphinium hybridum* Willd. var. *debilius* Ledeb. Fl. Rossica 1: 61. 1841.

Based on *Bieber*, Tauria. Not seen.

Stem 3.5–11.5 dm. tall, simple, densely strigulose throughout, more or less leafy; petioles strongly dilated at base, the lower 1–2 dm. long, the upper 1–3 cm.; blades of leaves 3-parted almost to base into cuneate-rhombic segments, these divided deeply into few divaricate, more or less falcate, linear-lanceolate lobes 1–3 cm. long, 1.5–4 mm. wide, somewhat pubescent especially beneath; raceme erect, dense, many flowered, 1–3 dm. long; bracts linear, the lower rarely 2–3-parted, 7–15 mm. long; pedicels suberect, 8–12 mm. long, strigulose; bracteoles at about the middle of the pedicel, linear-subulate, 3–6 mm. long; sepals lilac, obtuse, somewhat strigose, the upper oblong-ovate, ca. 12 mm. by 6 mm., the spur spreading, slightly curved, 16–20 mm. long; lateral sepals oblong-elliptic, 12 mm. by 6 mm., rounded-truncate; the lower 11 mm. by 5 mm., rounded-truncate; petals pale, the upper lamina almost straight, 10 mm. by 2 mm., glabrous, bidentate, the spur ca. 18 mm. long; lower laminae 6.5 mm. by 5 mm., bifid to near the base into acute lanceolate lobes, long-ciliate, the claw ca. 6 mm. long; stamens 5–6 mm. long, glabrous; anthers round-oblong, 0.8 mm. long; follicles 3, pubescent.



TYPE: Tauria (in Azerbaydzhan?), Herb. *Pallas* (LE); seen.  
No other material seen.

41. *Delphinium pallidiflorum* Freyn, Bull. Herb. Boiss. II. 1: 254. 1901. FIG. 4, M.

*Delphinium cyphoplectrum* Boiss. var. *pallidiflorum* (Freyn) Davis, Notes Bot. Gard. Edinb. 26: 171. 1965.

*Delphinium nachiczevanicum* Tzvelev, Not. Syst. Leningrad 19: 3. 1959.  
Based on *Egorova, Tzevelev & Czerepanov* 418 (LE) from prov. Nachiczevan, Azerbaidshan. Seen.

Stem terete, zigzag, 3–8 dm. tall, simple or sparsely branched, retrorse-strigulose below, with longer spreading glanduliferous hairs below the inflorescence; leaves few, short strigulose, the long petioles vaginate at the base, the blades round in outline, 5–6 cm. in diameter, palmately many parted, the lower into lanceolate, the upper into ultimate lance-linear laciniae 1–3 mm. wide; raceme short to long, lax, with spreading more or less glandular hairs; bracts entire, linear to linear-lanceolate, 3–7 mm. long; pedicels glabrous or pubescent, 6–20 mm. long; bracteoles below middle of pedicel, 2–4 mm. long; sepals violet-blue, bluish or light lilac, subglabrous, 11–13 mm. long, the spur 10–13 mm. long, blunt; petals pale, the upper glabrous, with narrowly lanceolate, oblique, bilobed blade, the spur ca. 10 mm. long; lower blades long-pilose, 5–6 mm. long, 3 mm. wide, deeply cleft into parallel lobes, the claw 5–6 mm. long; filaments pale lilac, glabrous; anthers yellow, minute; follicles 3, glabrous.

TYPE: Turkey, Armenia, Wan, Warack-Dagh, 2700 m., June 27, 1899, *A. Kronenburg* (G?), not seen.

DISTRIBUTION. Steppes and rocky places, 1900–2400 m., Turkish and Russian Armenia, northern Iraq and northwestern Iran.

EXAMPLES. Transcaucasia: *Heideman*, May 27, 1932. Russian Armenia: *Besser*. Iraq: *Gillett* 11782; *Rawi* 12213. Iran: *Koelz* 18015.

42. *Delphinium penicillatum* Boiss. Ann. Sci. Nat. II. 16: 369–370. 1841. FIG. 4, N.

Plant with short, viscid pubescence throughout; stem angled-striate, 2–3 dm. tall; leaves petioled, tripartite, the segments bipinnatifid into short linear setaceous lobes scarcely 1 mm. wide; lower blades roundish, to 5 cm. broad, upper smaller; racemes spiciform, strict, open, to 15-flowered, 5–12 cm. long; bracts deltoid-acute, 2 mm. long; pedicels 3.5–4 mm. long, bibracteolate below the middle; bracteoles linear, pubescent, ca. 2 mm. long; sepals hairy, oblong, pale blue, the upper sepal ovate, 6 mm. by 3 mm., subacute, spur straight, 9–9.5 mm. long, 2 mm. wide at base, gibbous at tip; lateral sepals oblance-spatulate, 6 mm. by 3 mm., pubescent along the middle line; lower sepals slightly wider, more pointed and pubescent; upper petals glabrous, the blades obliquely truncate, slightly divided, the lamina ca. 8 mm., the spur 10 mm. long; lower laminae ovate,



bearded, penicillate, ca. 5 mm. by 3 mm., deeply divided into 2 divaricate pointed lobes, claw ca. 4 mm. long; stamens 4–5 mm. long, ciliate; anthers yellow, 0.6 mm. long; follicles 2–3, subglabrous.

TYPE: *Aucher* 4034 from Mascate (Muscat?), Arabia?, (P); isotype (K); both seen.

RANGE. Apparently in arid places, Oman and southern Iran.

EXAMPLE SEEN. Iran: *Kotschy* 393a.

43. *Delphinium puniceum* Pallas, Reise 3: 327. 1776. FIG. 4, O.

*Delphinium hybridum* Willd. var. *puniceum* Claus, Ind. des in Göbel It. 2: 248. 1837.

*Delphinium hybridum* subsp. *puniceum* N. Busch in Fl. Cauc. Crit. III. 3: 55. 1903.

Plant somewhat strigulose throughout; stem 3–8 dm. tall, slender, terete, simple or few branched above; leaves few, the lower long petioled, the upper with shorter petioles; petioles dilated at base; blades 3–15 cm. in diameter, 3–5-parted to base, the parts then divided into linear strigulose lobes mostly 1–3(–6) mm. wide and with 1–2 divergent lobules; racemes dense, many flowered, 5–30 cm. long, densely, sometimes loosely strigulose; bracts entire, lance-linear, 4–6 mm. long; pedicels ascending, 7–12 mm. long; bracteoles 3–4 mm. long, mostly near the base of the pedicel; sepals deep bluish-purple, strigulose; upper sepal ovate-lanceolate, ca. 12 mm. by 3 mm., acute, the spur straight, obtuse, 11–12 mm. long, 3 mm. wide at the base; lateral sepals lanceolate, 12 mm. by 2 mm., subobtusate, slightly narrowed at base; lower sepals lance-oblong, 13 mm. by 4 mm., acutish; upper petal lamina purple, ca. 9 mm. long, the terminal lobules 1.5 mm. long, spur 10–11 mm. long; lower petals purple, the blade 6 mm. long, white bearded, the lobes lance-oblong, 4 mm. long; claw 6 mm.; stamens 6–7 mm. long, glabrous; anthers dark, 0.8 mm. long; follicles 3, erect, 10 mm. by 3 mm., more or less reticulate and strigulose, the styles 2–2.5 mm. long; seeds obscurely angled, covered with scales.

TYPE: near Salinas Tschaptschatschi near "Volgam australem" in Sibiria, Pallas misit 1781, (LE), seen. Photographs (E, K), seen.

RANGE. Region of Volga River to Georgia and Asia Media (Pawlowski, *Fragm. Fl. & Geobot.* 9: 437. (1963).

EXAMPLES. Georgia: *Hohenacker* in 1834; *Radde* in 1870.

44. *Delphinium quercetorum* Boiss. & Hausskn. in Boiss. Fl. Orient. FIG. 4, P.  
Suppl. 20. 1888.

*Delphinium hybridum* ssp. *laxiusculum* var. *pallidiflora* Busch in Fl. Cauc. Crit. III. 3: 57. 1903.

Stem to 3 mm. thick, glandular-pubescent in upper half, 3–4 dm. tall, mostly simple; lower leaves suborbicular, 1.5–3 cm. in diameter, strigulose, palmatisect into short divergent linear or oblong lobes; petioles



dilate-vaginate at base; raceme 7–12 cm. long, lax, 7–12-flowered, glandular-pubescent; bracts lanceolate, membranous, 4–7 mm. long, entire; pedicels pubescent, short; bracteoles near middle of pedicel, 2–3 mm. long; sepals pale bluish, somewhat pubescent; upper sepal lance-ovate, ca. 9 mm. by 3 mm., obtuse, the spur somewhat inflated at apex, 12–15 mm. long, 2.5 mm. wide at base, straight, horizontal; lateral sepals oblong-elliptic, 9 mm. by 4 mm., rounded-obtuse, pubescent on midrib; lower sepals pubescent, 7–9 mm. long, 4 mm. wide, subacute; upper petals whitish, the laminae 9 mm. by 2 mm., at right angles to the claw, with 2 short apical lobes, hirsute, the thick spur 11–12 mm. long; lower laminae 5.5 mm. long, heavily bearded, the linear-lanceolate lobes 5 mm. long, claw 5.5 mm. long; stamens glabrous, 5–6 mm. long; anthers bluish yellow, rounded, 0.8 mm. long; carpels 3, pilose their entire length.

TYPE: Mt. Pir Omar Gudrun, Persian Kurdistan, at 4000–5000', June 1867, *Haussknecht* (G) not seen; isotypes (BM, K) seen.

DISTRIBUTION. At 600–2000 m., Iraq, Iran.

EXAMPLES. Iraq: *Rawi* 23431, 22706, 22200; *Kass & Nuri* 27607. Iran: *Merton* 3935; *Wheeler Haines* 1712.

There is some question as to the distinctness of this species, since there is considerable variation in the specimens. It is near *D. cyphoplectrum*.

45. *Delphinium roylei* Munz, nomen novum.

FIG. 4, Q.

*Delphinium incanum* Royle, Illustr. Bot. Himal. 55. 1834, not E. D. Clarke, 1812.

Stem 5–10 dm. tall, simple or usually few branched above, terete, 3–5 mm. thick, closely and finely strigulose, so as to be more or less ashy, especially above; lower leaves withered by anthesis, 5–8 cm. in diameter, palmately multipartite into cuneate, deeply and sharply incised segments, the ultimate lobes sharp pointed, 1.5–3 mm. wide, greenish above, paler and closely strigulose beneath, the petioles to 1 dm. long, vaginate at base; middle cauline leaves remote, short petioled to subsessile; principal raceme commonly 1–2 dm. long, rather densely many flowered, the lateral racemes fewer and more loosely flowered; bracts linear, acuminate, 5–10 mm. long; pedicels commonly 1–2.5 cm. long, recurved at apex; bracteoles 2.5–3 mm. long, located near base of pedicel; sepals deep blue, densely strigulose; upper sepal 13–14 mm. by 8–9 mm., pointed, the spur horizontal, cylindric, straight, somewhat pointed, 15–16 mm. long, 3–3.5 mm. wide at base; lateral sepals broadly elliptic-ovate, obtuse, 15 mm. by 10 mm., strigulose on midline; lower sepals 15–16 mm. by 8–9 mm., subobovate, pointed; upper petals pale, the oblique glabrous lamina 8 mm. long, shallowly 2-toothed, spur ca. 14 mm. long; lower laminae deep blue, 6 mm. long, bearded, roundish, lobed for ca. 3 mm., the claw 5 mm. long; stamens 5–7 mm. long, subglabrous; anthers blue, 1 mm. long; follicles 3, strigose, 10–15 mm. long, 3–4 mm. wide; seeds ca. 1 mm. long, 3-angled, with ca. 5 transverse rows of scales.



TYPE: Kashmir: Purbunee, *R. Inglis* (LIV?); not seen.

RANGE. Grassy meadows and hillsides, 2000–5000 m., Kashmir.

ILLUSTRATIONS. BLATTER, Beautiful Fl. Kashmir 1: *pl.* 4. 1927; COVENTRY, Wild Fl. Kashmir 3: *pl.* 6. 1930.

EXAMPLES. A few of the many specimens, apparently all from Kashmir or environs are: *R. R. Stewart* 6530, 5694, 3156, 10546, 19586, 19693; *Duthie* 13440, 14091; *Falconer* 61; *Dickason* 365, 372; *Koelz* 9261; *Lace* 467; *Ludlow* 868, 8213; *Ludlow & Sherrieff* 7560, 8238, 9376; *Jacquemont* 673/791; *Schlagintweit* 3066, 5171.

The earlier use of the name *Delphinium incanum* by E. D. Clarke, *Travels* 2: 451. 1812, for a species from Cana, Israel, now referred to the genus *Consolida*, makes it necessary to give up Royle's later *Delphinium incanum*.

46. *Delphinium saniculifolium* Boiss. *Diagn. I.* 6: 6. 1845. FIG. 4, R.

? *Delphinium saniculifolium* Boiss. var. *refracta* Brühl & King, *Ann. Bot. Gard. Calc.* 5: 95. 1896. Not typified; no specimens cited.

Stem erect, terete, flexuous, mostly openly branched above, 3–8 dm. tall, glabrous or sparsely hairy (especially below); lower leaves with petioles 2–8 cm. long and more or less vaginate at the base, the blades palmately 5-lobed into broad cuneate divisions with few coarse terminal teeth, the laminae 2–5 cm. broad, glabrous or somewhat strigulose; cauline leaves few, smaller, palmately parted to the base; racemes lax, several flowered, in an open panicle, peduncled; bracts lance-linear, mostly 3–5 mm. long; pedicels divaricate, very slender, 5–25 mm. long; bracteoles 2 (3), ca. 2 mm. long, inserted near the base or the middle of the pedicel; sepals blue, subglabrous, the upper ovate, 7–8 mm. long, obtuse, the spur 7–9 mm. long, subcylindric, obtuse; lateral sepals elliptic-oblong, rounded at apex, 7 mm. long; lower elliptic, rounded at apex, 7 mm. long; upper petals bluish, the laminae oblique, glabrous, 7 mm. long, more or less bidentate, the spur ca. 9 mm. long; lower petals blue, the blades 4–5 mm. long, subovate, bearded, lobed for 2–3 mm., the claw 4 mm. long; stamens 4–5 mm. long, somewhat bluish, glabrous; anthers 0.6 mm. long; follicles 3, largely glabrous, 7–10 mm. by 3 mm., the styles ca. 2 mm. in addition; seeds scarcely 1 mm. long, obpyramidal, with several rows of scales.

TYPE: "In alpe Kuh-Delu Persiae australis," *Kotschy* 536, (G?), not seen; isotypes (A, BM, K, MO, UC) seen, but all in rather poor condition.

DISTRIBUTION. Southern Iran at 900–2400 m.

EXAMPLES. *Rechinger* 3364; *Haussknecht*, July, 1868; *Stapf* 2300.

47. *Delphinium schmalhausenii* Alboff, *Trav. Soc. Hort. Odessa* (Descr. nouv. esp. pl.) 1891; *Huth, Bot. Jahrb.* 20: 441. 1895.

FIG. 5, A.

*Delphinium hybridum* Willd. subsp. *schmalhausenii* (Alb.) Busch in *Fl. Cauc. Crit.* 3: 53. 1903.



*Delphinium hybridum* Steph. ex Willd. Sp. Pl. 2: 1229. 1799, not L., 1756.

*Delphinium freynii* Conrath ex Freyn, Bull. Herb. Boiss. 3: 36. 1895. Based on Conrath, 1889, Somchetia, Lok. 2300 m. (G); not seen.

*Delphinium somcheticum* Conrath & Freyn, Bull. Herb. Boiss. 3: 37. 1895. Based on Conrath, 1889, Somchetia, Tschatach (G); not seen.

*Delphinium halophilum* Huth, Bot. Jahrb. 20: 487. 1895. New name for *D. freynii* Conrath.

Stem single, 2–10 dm. tall, more or less zigzag, striate and usually glabrous below, glandular-pubescent above; lower leaves gone at time of anthesis; cauline rather long petioled (1–2 dm.) and petioles with broad base, upper petioles almost lacking; blades to 2 dm. broad, palmately multifid, then pinnately dissected into numerous very narrow laciniae; raceme solitary, long-cylindrical, rather dense; lower bracts foliaceous, laciniate, the upper trifid or entire; pedicels 5–10(–18) mm. long, glandular pubescent; bracteoles linear in upper half of pedicels; sepals dark blue, strigulose, the upper sepal linear-elliptic, obtuse, 9–10 mm. long, 3.5 mm. broad, spur ascending, straight, 15–20 mm. long, 3 mm. wide at base, acute; upper petals blue, glabrous, ca. 8–10 mm. high, short lobed, the spur 15–16 mm. long; lower petals with roundish hairy lamina 5 mm. long, rather deeply bilobed, claw 5 mm. long; filaments yellowish; anthers blue; follicles mostly glabrous, 10–12 mm. long; seeds with numerous membranous scales.

TYPE: Transcaucasia, *Alboff 190*, Aug., 1893. Not seen.

DISTRIBUTION. At 2000 m. or above, northern Turkey, Transcaucasia.

EXAMPLES. Turkey: Prov. Kars, *Davis 32512*. Transcaucasia: *Radde 428*; *Radde*, June 16, 1867; *Szowitz 391*; *Hohenacker* in 1834.

*Davis*, Fl. Turkey 1: 112. 1965, unites the above three proposed species (*Delphinium schmalhauseni*, *D. freynii*, and *D. somcheticum*) into one. The variation in size of flowers, character of pubescence (whether glandular or not), and in division of bracts does not correspond with any distinction in geographical distribution.

48. *Delphinium semibarbatum* Bienert ex Boiss., Fl. Orient. 1: 92. 1867. FIG. 5, B.

? *Delphinium semibarbatum* var. *hoeltzeri* Huth, Bot. Jahrb. 20: 424. 1895. Based on a *Hoeltzer* collection from Persia (LE); not seen.

*Delphinium hybridum* var. *sulphureum* Regel, Acta Horti Petrop. 5: 226. 1877.

*Delphinium zalil* Aitch. & Hemsl. Trans. Linn. Soc. II. 3: 30. 1888–1894. Based on *Aitchison 671*, Khorasan, Iran; isotypes seen (BM, GH).

*Delphinium biternatum* Huth var. *leiocarpum* Freyn & Sint. ex Freyn, Bull. Herb. Boiss. II. 3: 561. 1903. Aschabad, *Sintenis 383*; isotypes seen (BH, BM, E, K, MO, US).

Stem erect, 2–8 dm. tall, subglabrous to retrorse-strigulose, simple or few branched above; lower petioles to 1 dm. or longer, scarcely dilated at base, the cauline leaves several, gradually shorter petioled upward, the



blades 3-parted, then again ternate, ultimately divided into long linear lobes mostly 1–1.5(–2) mm. wide, the blades 2–10 cm. in diameter, subglabrous to somewhat strigulose; inflorescence with rather open, rather many flowered racemes 1–3 dm. long, often with smaller supplementary racemes as side branches; bracts mostly lance-subulate, 3–8 mm. long; pedicels 2–10 mm. long, stout, more or less glandular pubescent; bracteoles lance-subulate, at about the middle of the pedicel, 2–4 mm. long; flowers yellow or with a greenish tinge; sepals glabrous, broadly ovate, obtuse, 9–10 mm. long, the spur subcylindric, yellow, 7–10 mm. long; upper petals with the laminae ca. 10 mm. long, 3 mm. wide, attenuate into a bidentate minutely puberulent tip; spurs ca. 8 mm. long; lower laminae almost as long, bifid, yellow bearded, subserrate on the claw; stamens yellow, 4–6 mm. long, glabrous; anthers 1 mm. long; follicles 3, glabrous, suberect, 10 mm. by 3.5 mm., the styles 2 mm.; seeds quadrate, transversely fimbriate-lamellate.

TYPE: "In montosis prov. Khorassan Persicae orient. ad orientem urbis Mesched" (*Bunge*) (G), not seen. Isotype seen (P).

DISTRIBUTION. Mountain meadows and grassy plains to 2000 m., Transcaspia to Turkestan and Iran.

ILLUSTRATIONS. Trans. Linn. Soc. II. 3: *pl.* 3. 1888–1894; Bot. Mag. *pl.* 7049. 1889.

EXAMPLES. Transcaspia: *Litvinov* 443; *F. N. Meyer* 626. Turkestan: *Regel*, May 17, 1880; *Lipsky* 1706; *Sovetkina & Czausova* 4267. Iran: *Rechinger* 1698, 4934; *Merton* 3888.

49. *Delphinium semiclavatum* Nevski in Komarov, Fl. U.S.S.R. 7: 168, 726. 1937. FIG. 5, C.

Stem 5.5–7.5 dm. high, few branched with long virgate branches, densely retrorse-pubescent below, leafy at the base, the petioles 5–10 cm. long, dilated at their base, subglabrous; leaf blades suborbicular, almost glabrous, 3-parted to base, the segments sessile, the middle one obovate, cuneate at base, shallowly incised into 3–5 obtuse, oblong, rounded lobes 2–3 mm. broad, the lateral segments unequally incised into further divisions; raceme lax, few flowered, long and with a glabrous axis; pedicels glabrous, to 1.7 cm. long; bracts narrowly lance-linear, glabrous, 2–3 mm. long; bracteoles 1.5–2 mm. long, linear-subulate, inserted above the middle of the pedicels; sepals sordid lilac, glabrous, obtuse, 9–10 mm. long, 4.5 mm. wide; spur straight or nearly so, obtuse, gibbous below the tip, 10–12 mm. long, to 2.7 mm. wide at base; upper petals whitish, the laminae glabrous, oblique, bidentate, ca. 8 mm. long, the spur 9 mm. long; lower laminae round-ovate, 3 mm. long, bifid half its length, sparsely bearded, the claw 4 mm. long; follicles glabrous, 8 mm. long.

TYPE: Asia Media: Pamiro-Alaj occidentalis, Sangardak, June 20, 1896, *Lipsky* 1887 (LE); seen.

Near *Delphinium saniculifolium*, but flowers sordid lilac, not blue, spur longer; pedicels shorter, petals subglabrous.



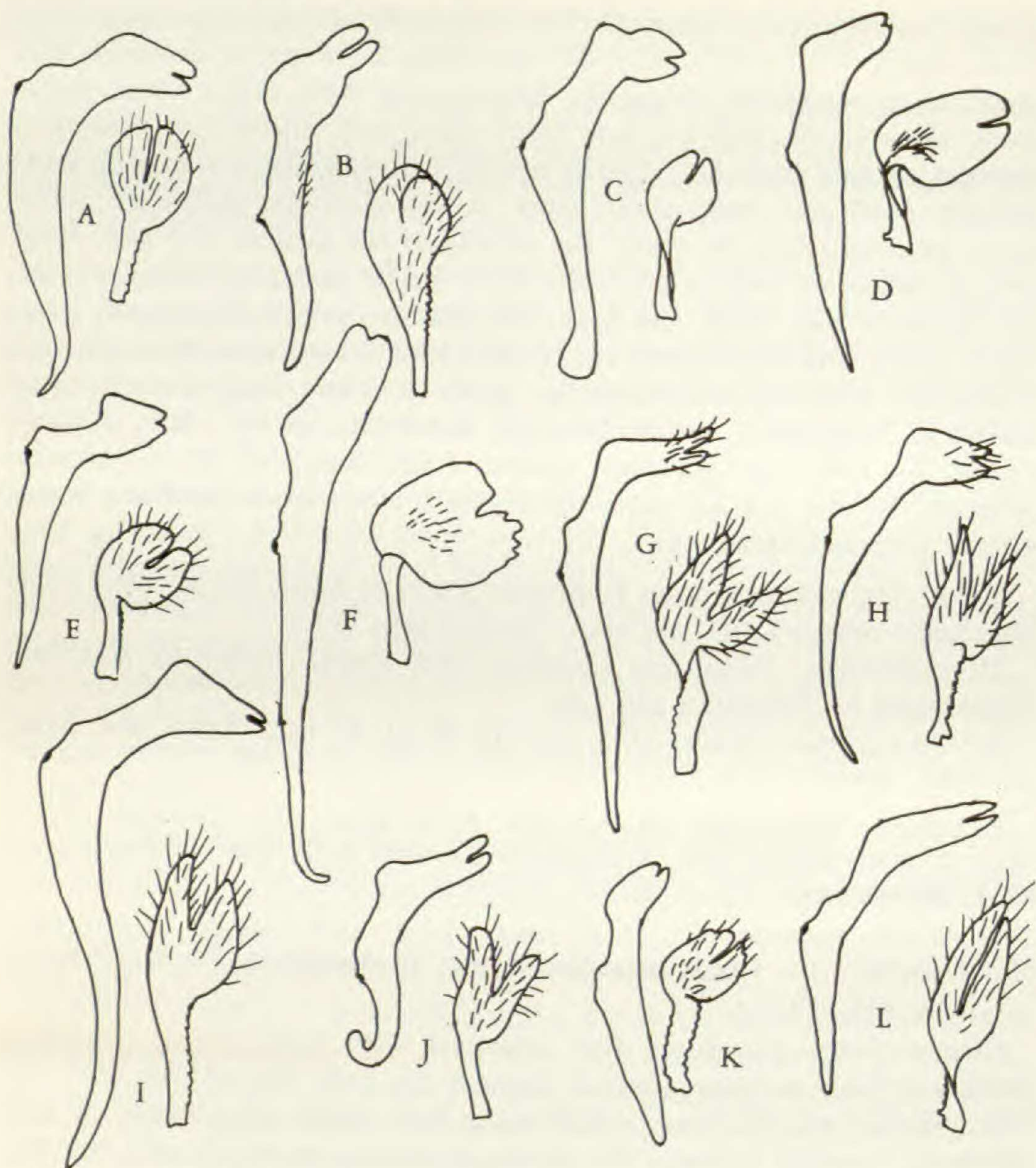


FIGURE 5. *Delphinium*, GROUP IV. Petals, the upper spurred, the lower clawed. A. *D. schmalhauseni*; upper lamina 8 mm. long, spur 15 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Hohenacker* in 1834 (BM). B. *D. semibarbatum*; upper lamina 10 mm. long, spur 8 mm.; lower lamina 5.5 mm. long, claw 5.5 mm.; drawn from *von Knorring* at Samarkand (GH). C. *D. semiclavatum*; upper lamina 8 mm. long, spur 9 mm.; lower lamina 3 mm. long, claw 4 mm.; drawn from *Lipsky* TYPE (LE). D. *D. suave*; upper lamina 8 mm. long, spur 12 mm.; lower lamina 6 mm. long, claw 4 mm.; drawn from *Aitchison* 862 ISOTYPE (BM). E. *D. szowitsianum*; upper lamina 7 mm. long, spur 11 mm.; lower lamina 4 mm. long, claw 4 mm.; drawn from *Szowitz* (GH). F. *D. tetanoplectrum*; upper lamina 12 mm. long, spur 20 mm.; lower lamina 5.5 mm. long, claw 5 mm.; drawn from *Koelz* 13725 TYPE (US). G. *D. tuberosum*; upper lamina 10 mm. long, spur 14 mm.; lower lamina 5 mm. long, claw 5 mm.; drawn from *Miss Lindsay* 1288 (MO). H. *D. tuberosum*; upper lamina 8.5 mm. long, spur 11.5 mm.; lower lamina 6 mm. long, claw 4.5 mm.; drawn from *Pichler* June 20, 1882 (type material of *D. caerulescens*, WU). I. *D. turkmemum*; upper lamina 11 mm. long, spur 21 mm.; lower lamina 5 mm. long, claw 6.5 mm.; drawn from *Sintenis* 1672 (MO). J. *D. uncinatum*; upper lamina



50. *Delphinium suave* Huth, Bot. Jahrb. 20: 470. 1895. FIG. 5, D.

*Delphinium penicillatum* Boiss. var. *macroplectrum* Buser in Boiss. Fl. Orient. Suppl. 19. 1888. Based on *Aitchison* 862.

*Delphinium saniculaefolium* Boiss. var. *kurramensis* P. Brühl in Brühl & King, Ann. Bot. Gard. Calc. 5: 95. 1896. New name for *D. penicillatum* var. *macroplectrum*.

Stem or stems slender, erect, simple or few branched, terete, more or less strigulose throughout or more loosely so in the inflorescence, 1.5–4.5 dm. tall; lower leaves apparently trifid into broad cuneate segments that are somewhat toothed or lobed, the laminae 1.5–2.5 cm. broad; petioles slender, 2–5 cm. long, vaginate at base; cauline leaves remote, short petioled, the blades 2–3 cm. long, with few lobes 1–3 or more mm. wide; inflorescence simple, racemose, several flowered, bracts entire, lance-linear, 3–8 mm. long; pedicels ascending, 5–15 mm. long; bracteoles lance-linear, 1.5–2 mm. long, above the middle of the pedicel; sepals pale blue, slightly strigulose, the upper about 7 mm. by 3.5 mm., the spur 10–15 mm. long, spreading, straight, pointed; lateral sepals round-obovate, pubescent on midrib, 7 mm. long, 5 mm. wide; lower sepals 8 mm. by 6 mm.; upper petals glabrous, the blade oblique, dilute yellow or bluish, 9–11 mm. long, with terminal lobes ca. 1 mm. long, spur 12 mm. long; lower petals with an oblong or roundish-oblong, sparsely bearded, blade divided to 2.5–3.5 mm., the claw 4 mm. long; stamens 4.5–5 mm. long, glabrous; anthers dark, 1 mm. long; follicles 3, strigulose.

TYPE: Afghanistan, 2600–3600 m., Kurram Valley or “in pratis vallis Alikel,” *Aitchison* 862; holotype (LE) and isotypes (BM, GH, P, PH), seen.

DISTRIBUTION. Rocky slopes, meadows, and the like, 2600–3800 m., Afghanistan, West Pakistan.

ILLUSTRATION. BRÜHL & KING, Ann. Bot. Gard. Calc. 5: pl. 117, fig. 3. 1896.

REPRESENTATIVE COLLECTIONS. Afghanistan: mt. above Sari Casma, *Bacon* 73. W. Pakistan: Chitral, *Harriss* 15837. Kohat, *Burt & Nairn* 586. Punjab, *Ram Bahli* 14811. Beluchistan, *R. R. Stewart* 579; *Appleton* 3862.

51. *Delphinium szowitsianum* Boiss. Fl. Orient. 1: 89. 1867.

FIG. 5, E.

*Delphinium hybridum* Steph. ex Willd. var. *szowitsiana* Trautv. Acta Horti Petrop. II. 2: 493. 1873.

*Delphinium hybridum* var. *dasyanthum* Avé Lallem. Ind. Horti Petrop. 1842, fide Huth.

*Delphinium dasystachyum* Boiss. & Hohen. ssp. *szowitzianum* N. Busch in Fl. Cauc. Crit. III. 3: 58. 1903.

*Delphinium tricolor* Bernh. ex Steud. Nomencl. ed. 2. 1: 489. 1840; *nomen.*

8 mm. long, spur 5.5 mm.; lower lamina 5 mm. long, claw 4 mm.; drawn from *Stewart* 12688 (NY). K. *D. ursinum*; upper lamina 7 mm. long, spur 9 mm.; lower lamina 4 mm. long, claw 4 mm.; drawn from *Rechinger* 6083 ISOTYPE (US). L. *D. vanense*; upper lamina 11 mm. long, spur 11 mm.; lower lamina 8 mm. long, claw 4 mm.; drawn from *Davis* 22735 (BM).



Stem simple, 3–9 dm. tall, closely strigulose or subglabrous below, densely strigulose and pubescent above, more or less angled and sulcate; leaves largely dead by anthesis, the cauline scattered, with petioles dilated at the base, short in upper leaves; blades largely 2–4 cm. in diameter, ternate, then laciniate into many strigose or pubescent linear lobes, 0.5–1(–2) mm. wide; inflorescence very dense, many flowered, to ca. 1 dm. long; lower bracts trifid, from a broad membranous base, upper mostly less than 5 mm. long, densely pubescent or strigose; pedicels generally less than 5 mm. long, the 2 lance-linear bracteoles 5–6 mm. long; sepals densely short-hairy, yellowish with greenish tips, the upper sepal ovate, 8 mm. long, spur short-hairy, suberect, 12–13 mm. long, 3–4 mm. wide at base; other sepals about 8 mm. by 4 mm.; upper petals with bluish tinge, ca. 7 mm. long, emarginate, very short-puberulent near base, the spurs ca. 11 mm. long; lower petals 7.5–8 mm. long, bearded, with rounded lobes 2 mm. long; stamens glabrous, 5–6 mm. long; anthers yellow, 1 mm. long; follicles pubescent.

TYPE: Russian Armenia near Nachitchewan, *Szowitz*, holotype (G?) not seen; isotype (K) seen, has "*Szovits 439*."

DISTRIBUTION. At 1800 m. or thereabouts, Transcaucasia, Russian Armenia.

ILLUSTRATION. Belg. Hort. 22: p. 48, pl. 3. 1872.

SPECIMENS SEEN. Russian Armenia: *Szovits* (GH, P, US); *Yaroshenka & Ubanove*, July 23, 1945. Transcaucasia: *Hohenacker*, July, 1838; *Heideman & Aliev*, July 27, 1932.

52. *Delphinium tetanoplectrum* Rech. f. Anz. Österr. Akad. Wiss. Math.-Nat. 91: 72. 1954. FIG. 5, F.

Stem 2–5 dm. tall, strict, erect, with short, more or less deflexed-appressed, non-glandular pubescence; lower and middle leaves with petioles 3–6 cm. long, membranous-dilated at base, the blades ashy-pubescent, round-cordate in outline, palmately lobed or incised, 1–2 cm. long, the divisions relatively simple; inflorescence very lax, few flowered, the axis with short crisped, mostly eglandular hairs; bracts narrowly linear-lanceolate, 4–6 mm. long; pedicels 1–2 cm. long; bracteoles inserted in upper third of pedicel, narrowly linear, acute, 3–4 mm. long; sepals pale purplish blue, ca. 8 mm. long, to 5 mm. wide, with short scattered hairs, the upper sepal ovate, the others elliptic-obovate; spur 15–20 mm. long, ca. 2 mm. wide when pressed, straight, acute, more densely pubescent than sepals; petals palish, the upper almost straight, the laminae oblong, glabrous, emarginate, ca. 12 mm. long, the spurs slender, 15–20 mm. long; lower petals with blade 5.5 mm. long and wide, round-obovate, sparsely bearded, shallowly bilobed, the claw 5 mm. long; stamens ca. 5 mm. long, glabrous; anthers pale, oblong, 1 mm. long; carpels 3, coarsely pubescent.

TYPE: Afghanistan, Lorinj, 2460 m., Aug. 27, 1939, *W. Koelz 13725* (US). The type and the other three collections were on loan to Dr.



Rechinger, in Vienna, and I am grateful to him and Dr. Riedl for kindly sending them on to me.

COLLECTIONS SEEN. Afghanistan: Gurzan, 2600 m., *Koelz* 14100; Baligali Pass, 2800 m., *Koelz* 13853; Sufedsang, 3070 m., *Koelz* 13986.

The species keys out with *D. micranthum*, of Kurdistan, but has the lower petal blade much wider and less hairy.

53. *Delphinium tuberosum* Auch. ex Boiss. Ann. Sci. Nat. II. 16: 370. 1841. FIG. 5, G, H.

*Delphinium tuberosum* var. *leiocalycinum* Bornm. Beih. Bot. Centr. 19: 201.

1905. Type, *Strauss & Bornmüller*, Mt. Latétar; not seen.

*Delphinium caerulescens* Freyn ex Stapf, Denkschr. Akad. Wien Math.

Naturw. 1886: 25; not Paxton, 1849. Based on a type from Jalpan (Djalpan), northern Iran (WU); seen. At the University of Vienna there is a series of four sheets from Mt. Elwend, each with "Legit Th. Pichler, 1882" and also "Iter Persicum, Dris. J. E. Polak." Of these, two have an additional label "Jalpan, 6-20-1882." Some of these specimens have the upper petals glabrous, others with a few or several stiff hairs. All have the same general flower color and form and the spur gibbous at the slightly curved apex. There seems to be the same general variation as I have found in other material referred to *D. tuberosum*. I am greatly indebted to Dr. Lothar Geitler of the University of Vienna for the loan of the type material of *D. caerulescens*.

Stem erect, flexuous or almost zigzag, 3-5 dm. tall, terete, slender, few branched, closely strigulose, sometimes apparently with a zone of gland-tipped hairs near the middle; leaves often largely gone by flowering time, the lower long petioled, the petioles long-vaginate at the base, middle cauline leaves remote, short petioled; blades 2-4 cm. wide, palmately parted into numerous mostly linear lobes, 1-2.5 mm. wide, strigulose; terminal racemes to 2 dm. long, usually with not more than 15 flowers, rather lax, the lateral racemes smaller, if present; bracts linear, 3-25 mm. long; pedicels 5-15 mm. long, ascending; bracteoles 1.5-5 mm. long, placed near or above the middle of the pedicel; sepals bluish or smoke-gray; upper sepal 8-10 mm. long, 4.5 mm. wide, pointed, mostly strigulose, the spur cylindric, horizontal, almost straight, bluish, gibbous at the curved apex, 12-15 mm. long; lateral sepals oblong-elliptical, 8-10 mm. long, 4-4.5 mm. wide, obtuse, strigose on midline; lower sepals 8.5-10 mm. long by 4 mm., oblong-elliptic, rounded at apex; upper petals oblique, the blade 8.5-10 mm. long, from glabrous to having a few stiff hairs on the surface or near the shallowly 2-lobed tip; spur 12-14 mm. long; lower petals heavily long bearded, the claw 4.5-5 mm. long, serrulate on one edge, the blade 5-6 mm. long, with 2 rather divergent pointed lobes ca. 4 mm. long; stamens 5-6 mm. long, glabrous; anthers whitish to bluish, 0.8-1 mm. long; follicles 3, ashy-strigulose to subglabrous, veiny, 8-12 mm. long, the style an additional 2.5 mm. long; seeds umbilicate, 1.2-1.5 mm. long, brownish, with transverse rows of pale scales.



TYPE: Mt. Elwind, near Hamadan, northern Iran, *Aucher* 79, holotype (P), isotype (K); both seen. Upper petals glabrous to few-haired.

DISTRIBUTION. At about 2000 m., Iran.

REPRESENTATIVE SPECIMENS. *H. F. Macmillan* 7, 8, 9; *Koelz* 18110a, 18144; *Miss Lindsay* 1288; *Pichler* in 1882; *Knappe* in 1884.

54. *Delphinium turkmemum* Lipsky, *Acta Horti Petrop.* 18: 2. 1901.  
FIG. 5, I.

*Delphinium hybridum* Steph. ex Willd. var. *pilosulum* Trautv. *Acta Horti Petrop.* 9: 437. 1884.

*Delphinium pilosulum* B. Fedtsch. *Fl. Tian-schan Occid.* 1: 98. 1904.

Stem or stems terete, 2.5–7 dm. tall, slender, pilose at base, glabrous in middle, more or less glandular-puberulent on pedicels and in inflorescence; lower leaves 3–6 cm. broad, subreniform in outline, 5-fid into cuneate segments with pinnate lobing into oblong parts 2–4 mm. wide, glabrous or with a few long slender hairs; lower petioles 4–10 cm. long, basally dilated; cauline leaves remote, with narrower lobes; petioles shorter; inflorescence a simple raceme or 3- or 4-branched in an open panicle of lax, several flowered racemes to 1.5 dm. long; bracts lance-linear, 2–6 mm. long; pedicels ascending, 7–10 mm. long; bracteoles 2, lanceolate, 1.5–2 mm. long, at about the middle of the pedicel; sepals pale violet-blue, the upper sepal ovate, glandular-puberulent, 8–10 mm. long, 4–5 mm. wide, the spur stout, horizontal, 16–20 mm. long, 3–4 mm. wide at the base, obtuse; lateral sepals oblong, 12 mm. by 6 mm., obtuse, glandular-puberulent on midrib; lower sepals oblong-elliptic, 12 mm. by 6 mm., rounded at apex, glandular-puberulent; upper petals oblique, yellowish, the lamina ca. 1 cm. long, the spur ca. 2 cm. long; lower petals 12–13 mm. long, the claw 6 mm., the blade bearded, lobed for about 3 mm.; stamens 5–7 mm. long; anthers yellow, 1 mm. long; follicles 3, glandular-pubescent.

TYPE: Kisil-Arwat, Turcomania, *Al. Becker* 29, Dec. 18, 1896 (LE); seen.

DISTRIBUTION. Turcomania, Transcaspia.

REPRESENTATIVE COLLECTIONS. **Turcomania:** *Litwinow* 447, 448. **Transcaspia:** *Lipsky*, May 8, 1912; *F. N. Meyer* 552; *Sintenis* 1672; *Lipsky* 3070.

55. *Delphinium uncinatum* Hook.f. & Thoms. in Hook.f. *Fl. Brit. Ind.* 1: 24. 1872.  
FIG. 5, J.

*Delphinium penicillatum* Hook.f. & Thoms. *Fl. Ind.* 48. 1855, not Boiss., 1841.

*Delphinium vestitum* Boiss. *Diagn. II.* 1: 13. 1853; *Fl. Orient.* 1: 92. 1867, not Wall. ex Royle, 1839.

*Delphinium uncinatum* var. *pseudovestitum* Brühl in Brühl & King, *Ann. Bot. Gard. Calc.* 5: 94. 1896. Based on *Stocks* 994, from Beluchistan; seen.

*Delphinium uncinatum* var. *aitchisonii* Boiss. in Brühl & King, *Ann. Gard. Calc.* 5: 94. 1896. Based on *Aitchison*, Dec., 1879 from Kurrum Valley; (CAL), seen.



Stem simple, terete, subflexuous, 1.5–9 dm. tall, subglabrous below, densely pubescent above with spreading hairs; radical leaves crowded, the petioles dilated at the base, 2–12 cm. long; laminae 3–5-sect to base, 1.5–6 cm. long, somewhat broader, subglabrous to villous, the segments narrow-cuneate at base, pinnately dissected into narrow toothed lobes commonly 1.5–8 mm. wide; cauline leaves few, somewhat reduced, the lobes narrower; inflorescence racemose or subpaniculate, 1–2.5 (–4) dm. long, lax, spreading-hairy; bracts lanceolate, 3–5 mm. long; pedicels commonly 4–6 mm. long; bracteoles lance-linear, basal, ca. 2 mm. long; sepals bluish purple to pale, sparsely villous, the upper oblong-ovate, 7–8 mm. long, pointed, the spur hooked, cylindric, 7–10 mm. long; lateral sepals hairy on midline, rounded at apex, 7–8 mm. long; lower sepals oblong, rounded at tip, ca. 8 mm. long; upper petals 7–10 mm. long, short bilobed at apex, the spur 5–6 mm. long; lower petals 8–9 mm. long, the laminae oblong, 5 mm. long, bilobed for ca. 3 mm., bearded, the claw 4 mm. long; stamens ca. 5 mm. long, glabrous or nearly so; anthers 0.6 mm. long; follicles 3, glabrous or hairy.

TYPE: *Stocks 994*, among wormwood on plains, Beluchistan (κ) seen. Cited by Boissier as *D. vestitum*, by Hook. f. & Thoms. for their *penicillatum*, and by Brühl and King for their var. *pseudovestitum*.

DISTRIBUTION. At 1000–2000 m., West Pakistan (Punjab, Beluchistan), Afghanistan, Kashmir.

ILLUSTRATION. BRÜHL & KING, Ann. Bot. Gard. Calc. 5: *pl. 116, fig. 2, 3.* 1896.

REPRESENTATIVE MATERIAL. Afghanistan: Kurrum Valley, Aitchison, Dec. 1879. Beluchistan: *Stocks 994*; J. H. Lace 3351, 3326. Punjab: R. R. Stewart 7002; G. Watt 603; Jacquemont 672. Kashmir: Stewart 12688, 27322; T. Thomson.

P. Brühl, in Brühl & King, Ann. Bot. Gard. Calc. 5: 94. 1896, proposed *D. uncinatum* var. *vicaryi* from the Punjab, based on *Vicary* from near Rawal Pindi. I have not seen the specimen, which seems to have been characterized largely by being glabrous. It probably is an unusually glabrous plant of *D. uncinatum*.

56. *Delphinium ursinum* Rech.f. Anz. Österr. Akad. Wiss. Math.-Nat. 88: 225. 1951. FIG. 5, K.

Stem grayish, 5–10 dm. tall, slender, erect, 1–2-branched above, strigulose, terete, few leaved; petioles somewhat dilated at base, the lower to 15 cm. long, the upper shorter, strigulose; leaf blades rounded-cordate in outline, 6–10 cm. broad, palmatifid almost to the base into 7 cuneate-obovate divisions, these 3-lacinate to about the middle, then again 3-lobed into oblong parts 3–6 mm. wide, mucronulate and obtuse or acute at apex; uppermost leaves trifid into lanceolate segments; inflorescence of 1 or more racemes, the terminal one many flowered and to ca. 3 dm. long, rather dense above, strigulose; bracts lanceolate, entire, 5–15 mm. long;



pedicels 2–10 mm. long, appressed to axis; bracteoles lance-linear, usually below the middle of the pedicel, 2–4 mm. long; sepals white, suffused with blue, nerves greenish, somewhat strigulose; upper sepal elliptic-ovate, 9 mm. by 5 mm., obtuse, the spur 8 mm. long, straight, subcylindric, ca. 2.5 mm. wide at base, 2 mm. at the blunt tip; lateral sepals elliptic, 8 mm. by 5 mm., obtuse; lower sepals like the lateral, but more pointed; upper petals with a bluish, almost straight lamina, bidentate at the apex, 7 mm. long, the spur 9 mm.; lower laminae bearded, 4 mm. by 3 mm., deeply cleft, the claw 4 mm. long, serrulate on back edge; stamens 4.5–5 mm. long, the upper filaments and anthers bluish; anther suborbicular, 0.6 mm. long; follicles 3, hairy.

TYPE: Iran, prov. Gorgan (Asterabad), at 2400 m., on Mt. Shahvar near Hadjilang, *K. H. & F. Rechinger 6083*, holotype (w), not seen; isotypes (K, UC, US), seen.

57. *Delphinium vanense* Rech. f. *Symb. Bot. Upsal.* 11(5): 8. 1952.  
FIG. 5, L.

*Delphinium cyphoplectrum* Boiss. var. *vanense* (Rech.f.) Davis, *Notes Bot. Gard. Edinb.* 26: 171. 1965.

Stem zigzag below, leafy, 3–5 dm. high, striate, strigulose, subsimple or short branched in lower half, the internodes 4–6 cm. long; petioles of lower leaves broadly vaginate, to 7 cm. long, those of lower cauline leaves 3–4 cm., the blades 3.5–6 cm. long and wide, round-cordate in outline, narrowly palmate-tripinnatisect, the ultimate lobes 10–15 mm. long, 1–1.5 mm. wide, divaricate, oblong-linear, acute, minutely strigulose, while in the upper cauline leaves the ultimate lobes are linear, 1 mm. broad; racemes glabrous to hirsute and viscid, lax, strict, erect; pedicels ca. 10 mm. long, divergent, the 2 bracteoles near the base, linear, ca. 3 mm. long; sepals deep blue to violet blue, almost glabrous, the upper sepal 10–12 mm. long, 5–6 mm. wide, lance-ovate, subapiculate, spur almost straight to slightly curved, obtuse, subglabrous, 10–12 mm. long, 2.5 mm. wide; middle sepals oblong-ob lanceolate, ca. 10 mm. by 3 mm., the lower oblanceolate with a broad base, 10–12 mm. long, 5–6 mm. wide, obtuse; upper petals about as long as sepals, the laminae glabrous, vertical to the spur, ca. 11 mm. long, narrow, bidentate at apex, the spur 11 mm. long; lower laminae long-hairy, 8 mm. long, lance-ovate, deeply divided into 2 lance-oblong lobes, the claw 4–5 mm. long; stamens 6–7 mm. long, glabrous; anthers yellowish-blue, round-oblong; follicles 3, subglabrous to hairy.

TYPE: Kurdistan (prov. Van, Turkey), 20 km. from Tatvan, at 1900 m., *Frödin 328* (UPS); not seen.

DISTRIBUTION. At 1900–2900 m., Turkish Kurdistan.

SPECIMENS SEEN. Turkey: Bitlis, *Davis 22542*; Artos Dag, *Davis 22753*.

The specimens cited have the narrow leaf segments of *D. laxiusculum*, but that species has strigose racemes.

[To be continued]